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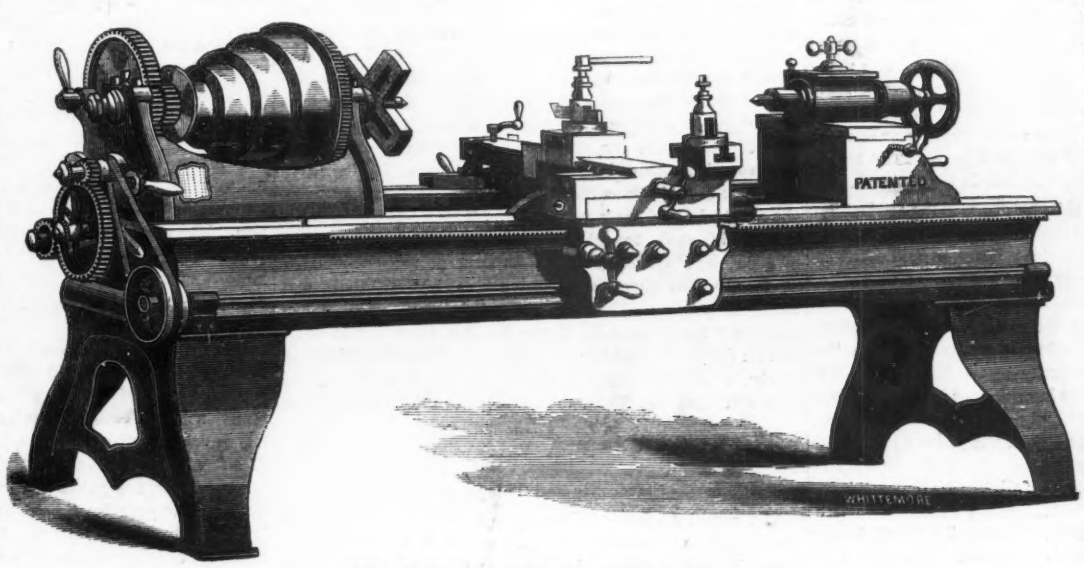
The Northern Pacific Railroad.

WITHIN eight months of the present time ground will undoubtedly be broken for the construction of the Northern Pacific Railroad, which is to extend from Duluth, at the head of Lake Superior, 1774 miles to Seattle on Puget Sound, thus forming the shortest possible link between the waters of the Pacific Ocean and those of our Northern Lakes. The Northern Pacific Railroad Company was chartered by Congress during the administration of President Polk, and the leading spirits in the enterprise were Southern politicians and capitalists, John C. Breckinridge, Beriah Magoffin, and several other members of the Kentucky political "ring," being among the projectors. Before the outbreak of the rebellion, the franchise of the Company passed into Northern and loyal hands. Gov. James Gregory Smith, of Vermont, is President of the Company. The Northern Pacific Railroad has a munificent land endowment, but, thus far, no loan of Government credit. No Government bond subsidy, such as that granted to the Central and Union Pacific, will be asked for the Northern line. The grant of Government lands already made by Congress to the Northern Pacific Road consists of 10 alternate odd numbered sections, or 12,800 acres, per mile through the States of Wisconsin and Minnesota, and 20 alternate sections, or 25,600 acres, per mile through the Territories. Along the main line and its branches this grant embraces nearly 50,000,000 acres of untouched soil, stretching in a belt 30 miles wide from Lake Superior to tide-water on the Pacific slope. For the first hundred miles west from the eastern terminus the road will pass through an almost unbroken pine and hard-wood forest, and for 700 miles more it will traverse a region of rolling prairie interspersed with timber, which is the very home of winter wheat, and which will, before many years, furnish bread to millions of people living in more Southern latitudes.

Then comes the mountain region of Montana and Idaho, with its mineral wealth and grazing lands. Crossing the Rocky Mountain range at a point where it is so broken down into scattered elevations as hardly to deserve the name, the road will enter the fertile valley of the Columbia river, and thence through a pass in the Cascade range to tide-water on Puget Sound. Unlike the Union Pacific, the proposed Northern route passes through few waste lands and plains, sage deserts and alkaline valleys. With our superficial geographical education, we have been in the habit of regarding our extreme Northwest territories as hardly less frozen and uninviting than Labrador. On the contrary, one leading advantage the Northern Pacific Road will have over the present completed line will consist in the fact that, although located six degrees further north, it will be easily kept free of snow the year round. The climate difference in favor of the Northern line is due mainly to the difference in altitude. For instance, along the whole length of the Northern Pacific line not more than 250 miles will have an elevation exceeding 3000 feet above the sea, while 1100 miles of the present Pacific Road are more than 4000 feet above the same sea level, and over 500 miles of the Union Pacific have an altitude of 7500 feet. While the highest point on the present line is 8262 feet above tide-water, the highest point on the North Pacific will be less than 4000 feet above tide-water. Jay Cooke & Co. will be the fiscal agents of the enterprise. The contract is already closed, with this exception, that the former insist upon making a personal inspection of the proposed route before entering actively upon the work. Accordingly, two parties, starting respectively from Puget Sound and Lake Superior, begin this week the survey, the Fiscal Agents of the Company being represented in each expedition. This preliminary examination of the line will probably be completed by the first of October next, at which time the two parties will come together, compare notes and submit their report.

The road is expected to be completed in five years, at a probable cost of $20,000,000. In connection with this work of construction, a Bureau of Immigration will be organized, having agents in all the countries of Northern Europe, to encourage and facilitate the migration of laborers, who will at first obtain employment on the railroad, and gradually become proprietors of the farm-lands along its line. From the Pacific at San Francisco to the Lakes at Chicago, it is 2423 miles; from the Pacific at Seattle to the Lakes at Duluth it is only 1774 miles. From Seattle to Chicago by way of Duluth (all rail), it is 2140 miles. From New-York to San Francisco *via* Chicago and Omaha, it is 3323 miles; from New-York to Puget Sound *via* Chicago and the Northern Pacific route, it is 3040 miles. Finally, from New-York to Shanghai *via* Chicago, San Francisco, and the Midway Island, it is 10,423 miles; from New-York to Shanghai *via* Chicago, the Northern Pacific, and Puget Sound, it is 8756 miles.—*Chicago Advance, July 15th.*



THE THOMAS ENGINE LATHE.—Fig. 1.

The Thomas Engine-Lathe.

AT the Thomas Iron-Works, Worcester, Mass., are designed and built all kinds of gear-cutting, cutlery, machinery, and patterns for heavy and light machinery. There is also manufactured at these works an engine-lathe, of Mr. Thomas's invention, which furnishes the accompanying illustrations (Figs. 1 and 2). The reader will note some of the peculiarities of this machine. Its sides are firmly tied together with cross-ties, unlike the common weight-lathe, and it has a large, powerful cone, with large gears, spindles, and centres to match, with hard gun-metal boxes, making it a powerful

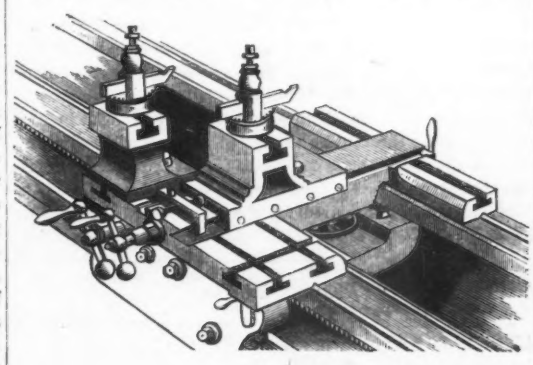


Fig. 2.

machine. The carriage is so constructed that it may be used with any improved weight alone, or it may be tightened with a hand-wheel and gib under the carriage, which makes the carriage slide firmly, thus adapting it to boring or squaring work at will. This carriage is very wide on the track, and will square out the full swing of the lathe without re-setting the tool, and it has no long, deep slot to get filled with chips, to be cleared out with an old file-shank, to the injury of the screw, but the top is plain, and protects the screw from dirt. The upper portion of the carriage removes, exposing the bolt-slots, for the purpose of bolting on work to be bored out. There is a shoe, or tool-post holder, which is reversible, that goes with the machine, for turning pulleys. The screw-cutting arrangement dispenses with an extra intermediate gear, by changing from right to left by means of a simple lever, and the screw attaches to the carriage by a clamp-nut, which is always ready at any distance from the head. The foot-block fastens with a star-wheel, which is a very quick and effectual operation, and dispenses with the old-fashioned bolts and nuts.

Coal in India.

THERE has been a great "find" of coal in the Central Provinces, and the fact is worthy of the attention of the Great Indian Peninsular Railway. The district of Chanda lies due south of Nagpore, between that and the river Wurdah, which forms the northern boundary of Hyderabad. For some years, Captain Lucie Smith, the Deputy Commissioner, has been boring for coal, and Mr. Mark Fryar, the practical geologist, sent out lately to report on our coal resources, has more than confirmed his estimate of the value of his discoveries. Mr. Morris, the officiating chief commissioner, has written with great caution on the subject, until Messrs. Mather and Platt's steam-borer, which has been sent for, arrives. But ordinary borings and the opinions of Mr. Medlicott, geological surveyor, Mr. Bonner, C. E., and Mr. Fryar reveal a vast and thick and uniform deposit of coal, which has led the last to urge government to begin mining operations at once, and to make a branch railway to the main Great Indian Peninsular line. The sandstones of the Chanda basin are the same as the well-known coal-bearing sandstones of Raneegunge, to which, indeed, Mr. Fryar compares the deposits in value and extent. He is confident that there are at least two square miles of coal 14 feet thick at a depth of 300 feet, and in easy working position, on the Chanda side of the Wurdah, while there is a certainty of more than the same area on the other side. This practical and cautious government geologist declares that the coal can be laid down, by branch railway, at Nagpore, at £1 a ton, giving a profit of 10s., while a ton of English coal costs £1 16s. at Bombay, and double that at Nagpore. If we so far discredit the Chanda coal as to say a ton of it is equal to only half a ton of English coal, it will still have 16s. in its favor at Nagpore. All India at present turns out 600,000 tons of coal a year, not more than the produce of one good colliery in England, and the two square miles of Chanda coal would give the same supply for thirty years. Labor is abundant; the mines would prove a boon to a poor population. This is no all. The finest, if not the largest, cotton mart in India lies between Chanda and the main line of railway. That is Hinganghat, the cotton of which is so good that its seed is being introduced wherever the Sea Island and Egyptian varieties do not suit the inland climate. The Chanda coal-field is to the south of Hingunghat, and to the north of the finest cotton districts of Hyderabad. Cross the Wurdah to the south and you come to Edulabad, the cotton of which is so good that an English merchant has just laid out £10,000 there, intending to send the produce down the river Godavery, of which the Wurdah is the main affluent, to Coconada. A branch line for the cotton alone was long ago projected to Hingunghat. Now there is the coal. If even half of Mr. Fryar's expectations are realized, the least known part of India will be opened up, and the feudatory provinces of the Nizam, who will be a minor for the next fourteen years, will be enriched, while they are made to contribute their wealth of cotton and coal to the general good. Ultimately the line must be continued due south to Hyderabad, the capital, which is to be connected to the westward, also, with the Madras line to Bombay.—*London Times.*

THE amount of marble shipped from East Dorset, Vt., will average twenty car-loads per week.

Lead Smelting in Missouri.

BY S. W. TYLER, ENGINEER.

THE lead region of the Mississippi comprises parts of the States of Iowa, Wisconsin, Illinois and Missouri; but as the smelting is carried on in substantially the same manner throughout the whole region, a description of the methods employed in one part—to wit: Missouri—will answer every purpose. In Missouri too, some of the largest and most successful lead-smelting establishments of the West are to be found and these furnish of course the best examples from which to judge of the development of the art in this section. It is true, great progress has been made in the last ten or twenty years; but the limit is by no means yet reached. The "log heap" and "ash-furnace" are indeed things of the past; and their places are supplied by the Scotch hearth and reverberatory furnace, with a gain of fully thirty-three per cent in the amount of lead obtained; but the actual loss, even in the best works, is still eighteen per cent, and over, of the entire amount of lead contained in the ore.

By the old method, from forty to fifty per cent of lead were extracted from ores carrying eighty per cent. The "log heap" or "furnace" was a cob-house, so to speak, of logs, with a clay floor, on which lead ores and fuel were piled up, in alternate layers, until the "heap" was complete, when the whole was fired. The reactions through which metallic lead was in this case disengaged are the same as those that take place in the manipulations upon the Scotch hearth, with perhaps some complications and imperfections added. The lead trickled down through the mass, and was collected by conduits in the clay below. Loss was occasioned by excessive vaporization of the metal, owing to the heat not being under control, and by waste in the slag. This process was sometimes aided by the intermixture of "dry bone," as it is called—that is, carbonate of lead—with the galena; but in general this ore was smelted by itself, when indeed it was not consigned to the waste heap as entirely worthless. The mass of slag and ashes remaining, after the burning down of such a heap, was treated in an "ash-furnace," which was a kind of rude reverberatory furnace. By this means, four or five per cent more of lead was *sweated* out, as it were. The whole process, with all its belongings, was rude in the extreme.

A great improvement upon this method was the application of the so-called American hearth, a modification of the Scotch hearth, used at the Rossie lead mines in St. Lawrence county, N. Y. This hearth was considered of so much importance as to be introduced into the smelting works at Bleiberg. It retained its footing there, however, but a short time, the objections to its use being its bad effect upon the health of the workmen, the severity of the labor of attending it, the skill demanded of the laborer, and its lack of adaptation to the smelting of slicks and poor ores. We will consider these objections when treating of the present process on the Scotch hearth.

This American hearth, of which full illustrations and description are given in Kerl's Metallurgy and Lamborn's Treatise on Silver and Lead, was worked with a hot air blast; and for fuel, wood in small billets was used. The blast was furnished by means of a couple of bellows, worked by horse-power—in use in some places to this day—and heated by being passed through the hollow cast-iron box, which formed the sides of the hearth. It escaped into the fire, generally through one tuyere, though in the German experiments the number was increased to three with advantage. The amount of fuel used with this method was not large, and the yield of lead was fair. The manipulation was pretty much the same as that now customary in case of the Scotch hearth.

Before going on to a description of the actual smelting processes, a few words respecting the concentration, or preparation of the ores, will not be amiss; for usually in the country a good share of this work falls to the lot of the smelting establishment. As a rule, the contrivances for accomplishing this are very simple and primitive, not to say wasteful, and the whole system is in every respect behind the times. A reason for this is found in the desultory, unskilful manner in which the whole business of lead producing has until within a short time been carried on. By way of parenthesis, it may be well to remark here that lead mining and smelting have been generally carried on here as distinct avocations. The miners were usually men of small capital, often with nothing but muscle, pick and shovel to rely upon; perhaps half the year farmers, who sub-let a "claim" from the lessee or owner of the mineral land, and upon this proceeded to sink pits in search of surface mineral. A collocation of several of these pit-sinkers constituted the "lead-miners," and the pits the "mines." Each miner prepared his own mineral for the furnace. The furnace-owners, again, were, for the most part, lucky smelters simply, who had neither wit nor capital for improvements, but were content to go on in the old way, as long as the miners could furnish them with mineral without any difficulty.

But to return to the subject proper in hand: The ore comes to the furnace in two classes—"good mineral," which has been subjected to hand-cleaning only, with a small sharp-edged hammer known as a "pickawee;" and "wash-mineral." The latter is the product of the miners' dressing department, which latter consists usually of a sluice-box from sixteen to eighteen inches wide, and a jigger worked by hand. With this apparatus, the skilful washer will separate two or three grades of ore, called coarse mineral, fine mineral, and "smittem," or "*schlich*," as the German miners term it, from the "wash-dirt" or debris of the mines, and from the pounded "burn rock," or ore too poor for "pickaweeing." The good mineral bears a standard price in each locality; but the price of the "wash" varies in accordance with local custom, the gangue matter mixed with it, the size of grain, the kind of smelting furnace used, etc., except, of course, where there is free competition, which regulates all prices.

In some districts, rollers are employed for crushing the ore, but beyond this the application of machinery is very limited. The "wash mineral" as received at the furnace is considered fit for smelting without further attention. The "good mineral," a tolerably pure galena, is received in fragments, of a ton's weight or less, and must be reduced to a manageable and uniform size before it can be treated on the hearth. This is accomplished by means of a pair of rollers or a Blake's crusher, set so as to allow the passage of pieces of an inch or three fourths of an inch in diameter; or more generally by the aid of a "bucking table"—which is, what its name implies, a stout table of some three feet square, with a top formed of wrought-iron grate-bars, set firmly one inch apart. Upon this the ore is shovelled and beaten with the bucking iron fine enough to pass through the interstices of the grating. The bucking iron is made of a flat piece of wrought iron or steel, 4×6 inches square and one inch thick. On one flat side of this an eyelet of iron is strongly welded, in which an elastic wooden handle is made fast.

However, before this crushed ore can be smelted to advantage, it must be freed from the mineral dust, or "sludge," resulting from the bucking, and more particularly from the clay and dirt brought in with it, as well as from the fragments of rock and gangue which the "pickawee" had failed to remove. This is sought to be accomplished by a more or less thorough washing in a sluice-box, under a heavy stream of water—that is, under what will pass through a two-inch pipe, with a twelve or fourteen foot head. This sluice-box is, say, 16 inches wide by 12 inches deep, and from 20 to 30 feet long. It is sometimes furnished with a gate at the lower end, forming a reach of still water, in which most of the sludge is deposited. This is cleared out about twice a week, and the sludge thrown into a proper repository, where it remains until enough has accumulated for a special job, when it is sluiced, jigged, and smelted as wash mineral. Or instead of a gate—perhaps in conjunction with it—a deep box is set in the ground at the end of the trough, to catch the fine particles of mineral. However rude these contrivances may seem, the actual loss of ore is very small. The washed mineral is shovelled from the trough into a barrow, and dumped, in heaps of 3000 pounds each, on the platform, at the back of the smelter. Two men, with convenient arrangements and plenty of water, will buck, wash, and deliver 9000 pounds of ore in a "tour" of eight hours, besides attending to their further duty of weighing and piling the lead, removing the scoriæ, etc. With the aid of one of Blake's crushers, two men will handle in the same time eighteen thousand pounds.

[To be continued.]

Electricity and Telegraphy.

WE regret to have to announce that a fault has been discovered in the 1866 Atlantic cable, the distance being estimated at about 150 miles from the Irish coast. The fault is not of so serious a nature but that communication can be carried on; it has been, however, determined to take steps to immediately repair it. This is the fourth interruption in this cable, which may be looked upon as excessively unfortunate: the 1865 cable, however, is, and always has been, in perfect condition.

The manufacture of the British Indian Submarine cable, at the Telegraph Construction and Maintenance Company's works at East-Greenwich, is making rapid progress, over 500 miles of the deep-sea section between Aden and Bombay being completed. The *Great Eastern* having arrived at Sheerness from the successful laying of the French Atlantic cable, will be at once put in order to receive the British Indian cable, the major portion of which she will carry out in the winter.

The main Black Sea cable, of about 200 miles in length, has been successfully submerged by Mr. Siemens. The Norwegian cable from Peterhead to Norway has also just been laid by Mr. Henley. Mr. Henley is now manufacturing at his works a length of cable for the Mediterranean Extension Telegraph Company, to form a duplicate line between Malta and Sicily. The various arbitrations between the Post-office and the telegraph companies having been brought to a satisfactory conclusion, the Money Bill has been brought in, and is now passing through its various phases. It will before the close of the session have completed its parliamentary stages, and shortly we hope to place the subject before our readers. The total amount required for the purchase of the various telegraphs is estimated at £7,000,000.—*Mechanics' Magazine.*

A Grand Scheme.

THE untutored savages who roam the deserts of Central Africa little imagine what a surprise the indefatigable M. Lesseps is preparing for them. During the progress of the works at Suez he dispatched a number of engineers to the Desert of Sahara to ascertain the exact difference between the level of that tract of country and the surface of the Red Sea. The surveying party on their return reported a declivity of 27 metres, which is presumed to become still greater further inland. M. Lesseps now suggests the possibility of letting the water of the Red Sea into the interior of Africa by means of a canal, and thus converting this hitherto almost unexplored desert into a large inland lake, which would afford easy access to the fertile countries surrounding it. The good consequences of such an achievement, in a commercial sense, would doubtless be vast; but to the present inhabitants of the country the project would be fraught with obvious inconvenience.—*Pall Mall Gazette.*

Street-Pavements, Sewage, Drainage, and Roadway.

THE subject of street-pavements in this city is beginning to attract the attention and call out the criticism of practical engineers to an extent that seems likely to result in considerable benefit to the interested public. The fact, however, remains, and is but too obvious. In none of the several metropolises of the world is so large an amount yearly squandered in construction and repairs, and to so little purpose, as in this leading mart and metropolis of the Western Continent. Various causes have operated to produce this result; and various reforms, therefore, must of necessity be adopted before the effect, eventuating in the worst paved city of its extent within the circle of Indo-European civilization, can be obviated.

Legislative attention must be directed to the foundation of a bureau of construction and repairs, consisting of competent engineers, whose powers, within certain limits, shall be arbitrary, and not subject to the interference of the Common Council, except, possibly, in the matter of expenditure. This commission should be invested with the power to perfect and apply a thorough, comprehensive, and scientific system of sewerage and drainage; and with a board of this kind in operation, New York might expect and anticipate that within five years after its organization the triple problem of sewerage, drainage, and pavement would be solved and applied with just regard to the health, convenience, and necessities of its million of inhabitants. The sewerage system is particularly defective and unscientific. Were six weeks to occur in succession without appreciable fall of rain—a contingency liable to happen any summer—this city would be little more than a pest-hole, the carrying off of the sewage being in so great a degree dependent upon the rain-fall. In fact, there are points at which three weeks of drought would work a similar effect; as, for instance, at the corner of Eleventh street and Sixth-avenue; and, as it is, with the ordinary meteorology of a summer, it may be remarked that the great prevalence of summer epidemics in this metropolis, which, by virtue of advantageous situation, ought to be more healthful than either London or Paris, is due principally to defects in the sewerage and drainage system. The reports of the Croton Board, which ought to be packed with the suggestions of practical engineers as to these important subjects, afford only meagre details of receipt and expenditure—very necessary in their way, to be sure, but by no means so valuable that they ought to be permitted to crowd out other and equally important matters.

The failure to adopt a practical and sufficient system of sewerage has had the effect to complicate the pavement problem to a considerable extent. No pavement in use in the city is susceptible of being taken up and put down in blisters of a few hundred square feet without injury to the whole adjoining fabric, and yet this piecemeal process is necessitated from year to year by the present system of sewerage. The laying down of a new gas-main or of a new sewerage-pipe necessitates the disturbance of hundreds of square feet, or hundreds of square yards of pavement, and for no other reason than that no sufficient plan for carrying off the sewage of the city has been yet put in operation. That the sewers of the city should be large enough to admit of underground repair, without disturbing the surface, is, in the abstract, conceded; but the concession is qualified with so many objections that practical adoption is indefinitely postponed, and in the mean time the old and inadequate system prevails, at an expense of a quarter of a million or more per year. The truth is, no reason can be quoted why sewers should not be constructed sufficiently large to admit of the passage of gas-mains, etc., by the half dozen, and yet preserve all the efficiency in carrying off refuse matter claimed for the pipes in present use. General Viele, than whom New-York has no more unremitting student in the application of engineering to this purpose, has, in fact, digested a plan to effect a combination of the good qualities claimed for both systems, the application of which would obviate the necessity for disturbing the surface in the repairing of sewers and the putting down of new gas-mains. The effect of its introduction would be to enable the gas companies to pass their mains along within the periphery of the sewer by the half dozen if necessary, thus relieving companies of a large expense, and laying the foundation for a more active competition, by which the cost of gas to the city might be materially lessened; and that some more adequate plan must eventually supersede that in present use is quite unquestionable. The creation of a board of construction and repairs upon the plan hitherto specified would, no doubt, result in the adoption of this draining or something similar, and until that desideratum is attained, New-York will probably blunder on at an expense of half a million a year for the repair and extension of a system of sewerage which must be given up at last as inadequate.

The success which has attended the limited independence of the Park Commissioners in managing the details of the work committed to them is a proof of the policy and economy of eliminating the question of politics from the conduct of public works in as far as may be practicable, and of what may be done by a well selected board, comparatively independent of political considerations. The want of success which has attended the subjection of the appropriation for the removal of the Hell-Gate obstructions to political influence is another proof (by *reductio ad absurdum*) of the same principle, and both point to the necessity for the creation of an independent board of construction and repairs for the evolution and carrying out of an adequate system of drainage, sewerage, and street-pave-

ment, neither of which can be separated from the other two without involving a certain want of unity in the application of engineering to city improvement. The complication of the pavement question is mostly due to three causes: First, the necessity for frequent taking up and relaying of the roadbed occasioned by the laying or repair of sewerage-pipes—the laying or repair of gas-mains, and the laying or repair of city railroad-tracks; secondly, the contract system, resulting in defective and unscientific construction, and equally unscientific and defective repair; and, thirdly, the speculative and experimental element, eventuating in the testing of new inventions at a considerable yearly expense to the city. A board of construction and repairs, consisting of competent engineers, would obviate all these objections, and put the city in possession of the best attainable pavement at far less expense per year than is now disbursed in behalf of the piecemeal of construction and repair which has been going on for the past thirty years.

STATISTICS OF THE SUBJECT.

The new pavement which has been put down on Broadway, in sections exceedingly well done, forms a notable exception to the general workings of the contract system, for which the public is indebted, not to any adequacy of the system itself, but to the honesty and enthusiasm in his work of Mr. Guidet, the contractor. The total length of the stone block pavement now laid in the city is eighty-one miles and 3431 feet, some of which (400 lineal feet on the Bowery) was put down in 1852; and in only a small portion of this amount, a few thousand lineal feet in all, has the Russ patent been infringed upon. The statistics of the several kinds of pavement laid down within twenty years, presented by a survey of the city, would stand approximately as follows:

	Square Yards.
Stone block,	1,913,342
Nicolson,	58,564
Fisk concrete (estimated),	5,000
Stafford (estimated),	700
Cobble-stone (estimated),	3,000,000

Since 1866 the disuse of the cobble-stone pavement has become a feature of street improvement. During that year 17,254 square yards were put down—under contract, 10,222, and at private expense, 7032—but one ordinance looking to the laying of it in any part of the city being passed while the previously mentioned work was going on. This ordinance provivded for a cobble-stone pavement on Bank-street, from West-street to the river. The career of the Nicolson pavement began with the disuse of the cobble stone, in the putting down of 490 square yards on Nassau-street in 1866, of 29,001 in 1867, and of 20,073 in 1868. A contract was also made for laying the Fisk concrete pavement along One Hundred and Seventy-fourth street, from Third to First avenue, and an experiment with the Stafford pavement was tried at private expense in Wall-street, between William and Hanover. An ordinance in favor of the latter on Seventh-avenue, between Fourteenth and Fifty-ninth streets, was also passed, together with six ordinances, amounting in all to 50,000 square yards, in favor of the Nicolson; six ordinances, amounting to about 60,000 square yards, in favor of the McGonegal; two ordinances, amounting to 40,000 square yards, in favor of the Brown & Miller; and three ordinances, involving about 20,000 square yards, in favor of the Fisk concrete; fifty-six ordinances, summing about 400,000 square yards of stone block pavement, complete the provisions for the year.

The application of the Russ patent has been very limited though some royalty was paid in 1849 in the paving of Broadway, between the Battery and Franklin-street, and between Canal and Fourteenth streets. The section between Franklin and Canal streets, put down in 1853, was laid in ordinary stone block; also the section between Seventeenth and Twenty-third streets, in 1862; also that between Twenty-third and Fifty-ninth, executed in 1863. Park Row was paved with the Russ patent in 1856, and since then its advantages have been mostly disregarded. The statistical history of Broadway up to 1868-9 may be briefly put in table:

Year.	*Section.*	*Lineal feet.*	*Pavement.*
1849,	Battery to Franklin,	5,780	Russ.
1849,	Canal to Fourteenth,	7,450	Russ.
1853,	Franklin to Canal,	780	Stone block.
1862,	Seventeenth to Twenty-third,	2,000	Stone block.
1863,	Twenty-third to Fifty-ninth,	9,420	Stone block.

These data serve to exhibit the fact that under ordinary conditions, Broadway wears the stone-block pavement too smooth for safety in something less than twenty years, and fixes the limit of the durability, provided the pavement be put down sufficiently well to defy strain and other causes of dilapidation. The attrition of vehicles and horses producing this result has been recently subjected to statistical observation by a curious engineer, whose notes afford the following tabulated returns as to the number of vehicles passing the Astor House between seven A.M. and eight P.M.:

Seven A.M. to Twelve M.	*Up.*	*Down.*
Stages,	714	691
Double trucks,	397	616
Single trucks,	1,151	1,213
Double carriages,	158	158
Single carriages,	70	93
Total,	2,490	2,771
Twelve M. to Five P. M.		
Stages,	710	683
Double trucks,	512	476
Single trucks,	1,335	1,214
Double carriages,	191	205
Single carriages,	101	85
Total,	2,879	2,663
Five P.M. to Eight P.M.		
Stages,	442	432
Double trucks,	173	194
Single trucks,	287	282
Double carriages,	94	124
Single carriages,	45	25
Total,	1,041	1,057
Complete total,	6,310	7,491
Up,		6,310
Total in both directions,		13,801

From these figures some idea of the tremendous daily attrition brought to bear upon the pavement of this thoroughfare may be gathered if, for the remaining eleven hours, an addition of only 3000 be averaged, making in all a round total of 17,000 vehicles for the twenty-four hours; and if subjected to this wear, the stone-block pavement may be calculated upon the basis of renewal once every fifteen years, it must certainly take its place as the most economical which engineering skill has yet developed. Taking these figures, with the attrition indicated, as indicial of the capacity of the Russ pavement, it may be remarked that, under ordinary conditions, the Russ patent possesses few advantages over the stone block as generally put down, and, with the frequent necessity for removal in spots occasioned by the administration of the Croton Board, presents some grave disadvantages. It is now some years since General Viele conducted a couple of experiments, which resulted in the rejection of the Russ patent for ordinary purposes of pavement, except where heavy traffic was to be anticipated. One of these consisted in the laying of the stone blocks upon a bed one foot thick of sharp, clean sand, and was applied to a section of Thirty-fourth street; the other, in substituting a bed of broken stone one foot thick. The latter was conducted on a section of Fourth-avenue. Both are inferior in durability, when subjected to great strain, to the Russ pavement; but both have the advantage over the Russ of being taken up and replaced in portions with less injury to the general fabric; and hence, in connection with the present sewerage system, are preferable, except here and there in sections where great strain is to be endured.

There seems to have been no reason, however, why the concrete bed of the Russ patent should have been adjudged subject to proprietorship under the patent law, there being nothing original in the idea historically considered. The concrete bed has been in use historically nearly or quite eighteen centuries, and is supposed to have been invented by the Romans, who, however, superadded an upper structure of sandstone, quite superior to the trap superadded by Russ, in that its tendency was to wear more roughly. An argument very strong in itself against the use of trap for the super structure is found in the increased wear and tear of horses and vehicles occasioned by it, which is estimated by experts at an average of twenty dollars per year on the shoeing of horses, twenty-five dollars per year excess over the ordinary wear of horses by draught upon common and better adapted surfaces, and twenty-five dollars per year excess over the ordinary wear of vehicles on roadbeds of less grinding surface to tires. Estimating the number of horses and vehicles in use in this city at 150,000, it will be seen that not less than $10,500,000 might be saved annually by the adoption of some less grinding substitute for the hard trap of the Russ and Belgian and stone-block superstructure; and the inference may be drawn that the question of expense of construction and repairs is not the only important economical question involved. The relative cost per square yard of the several pavements in use may be averaged as follows:

Stone block (Belgian),	$2.50
Russ, or stone block with concrete bed,	3.20
Nicolson,	4.00
Fisk concrete,	2.60
Stafford,	3.50

Reserving description of these pavements, wooden and stone, for the present, a brief survey of the system in use in Paris—the queen city of the world as respects the application of engineering to the solution of practical problems of improvement—may be attempted, involving incidentally the application of *béton Coignet* to the purposes of sewerage, flagging, sidewalks, and the like.—*Herald.*

[To be continued.]

The Humboldt Celebration.

THE Committee for the celebration of the centennial birthday of Alexander von Humboldt, on September 14th next, and the erection of a monument to his memory in the Central Park, met at the office of Mr. Fred. Kuehne, the Treasurer of the Committee, No. 51 Broad-street, yesterday afternoon, Mr. C. E. Detmold presiding. The following resolutions were passed:

Resolved, That a Finance Committee of three be appointed by the Chair for the purpose of completing the subscriptions and collecting the necessary funds.

Resolved, That a Committee of Arrangements for the celebration, of three, be appointed by the Chair, with the power to increase their number.

A Committee of Finance was appointed—Messrs. W. T. Blodgett, Fred. Kapp, and Fred. Kuehne—to whom was added Mr. Detmold, the Chairman of the General Committee. As Committee of Arrangements, Messrs. Fred. Kapp, Professor H. Kearner, and Fred. Kuehne were appointed, who added the following names to their number: Messrs. Thomas Warker, Th. Heidenfeld, A. Klamroth, Ch. S. Triata, Dr. Lellman, and William Steinway. The expenses for the monument, consisting of a colossal bronze bust of Humboldt, representing him in the prime of his life, on a pedestal column of red granite, will amount to about $4000, while the collections thus far made amount to only $2987.50. The bust has been modelled at Berlin, and cast at Brunswick, Germany, and will be shipped for New-York on August 15th. The Committee of Arrangements will meet again on Thursday next, in order to decide finally upon the arrangements for the celebration. Humboldt celebrations will also be held in the following cities: San Francisco, Cal.; Sacramento, Cal.; St. Louis, Mo.; St. Joseph, Mo.; Kansas City, Mo.; Leavenworth, Kansas; Davenport, Iowa; Council Bluffs, Iowa; Chicago, Ill.; Peoria, Ill.; Alton, Ill.; Belleville, Ill.; Milwaukee, Wis.; St. Paul, Minn.; Indianapolis, Ind.; Detroit, Mich.; Cincinnati, Ohio; Cleveland, Ohio; Nashville, Tenn.; Wheeling, West Va.; Baltimore, Md.; Charleston, S. C.; New-Orleans, La.; Washington, D. C.; Philadelphia, Pa.; Pittsburg, Pa.; Trenton, N. J.; Newark, N. J.; Jersey City, N. J.; Hudson City, N. J.; New-Haven, Conn.; Boston, Mass.; Buffalo, N. Y.—*Exchange.*

The Grass Valley Mines.

THE STRIKE—IS GIANT POWDER INJURIOUS TO THE HEALTH?

TO THE EDITOR—SIR: Being at Grass Valley the other day, I took occasion to inquire into the circumstances of the present strike among the miners, and I am a little surprised to find how much less than even the ordinary small amount of common-sense possessed by such organizations has been displayed in this case by the Miners' League. A review of the circumstances will be instructive:

In the first place, the Grass Valley mines, being mostly on narrow veins, are burdened with heavy costs of extraction of ore, and the old-fashioned system of large double drills and black powder is, under such conditions, peculiarly expensive. In order to get room to swing a sledge, the stopes must be made much wider than the vein, and wider than they would need to be for single drilling. In consequence of the quantity of water in many places (and invariably in the bottom of the shaft), a great deal of time is lost in charging and tamping holes with common powder, and the practice of working two men at each hole results in much more idleness than would be the case if the men worked singly; since whenever one of them stops for any cause the other must stop also. Finally, the old system of organization gave the miners many opportunities, of which they were not slow to avail themselves, to pilfer small specimens of the very rich gold quartz which so frequently occurs in the mines of this district. It is a well-known peculiarity of Cornish miners that, although, as a class, sober and well-behaved (in many cases even religious), they have no conscience concerning the stealing of specimens, and do not consider it wrong to cheat concerning the underground work. They have been educated to believe it to be the business of the foreman or mining captain to watch against such peccadilloes, and if he is not sharp enough to catch them, they do not hesitate to overreach him in every way. The miners of Grass Valley have suffered especially from the stealing of rich rock by the miners. To break a piece of quartz, however valuable, from a mine, and to carry it away without the owner's permission, is not legally theft, but trespass. *After the rock has been broken*, the dishonest removal of any of it from the dump or pile is larceny; but it is generally impossible to get evidence which will satisfy a jury of the latter crime; and even when the evidence is sufficient, a Nevada county jury has never been known to convict; hence the thriving miner has hitherto enjoyed a substantial immunity from punishment. Most of the companies do what they can to prevent loss from this source, by obliging the workmen, on emerging from the mine, to strip off their wet clothes in the "drying-house," and walk naked across the room before putting on their above-ground suits. But in spite of all precautions, the plundering is known to be considerable.

A year ago Giant powder was introduced here, and it was soon found to effect a great saving in the mining cost. Single drills, small holes, no waste of time by partners, no delay in blasting wet ground—these were among its mechanical advantages; while the employment of one or two men in each shift for the special duty of firing the blasts and cleaning up the stopes prevented all access on the part of the miners to the newly broken rock, and put an instant end to the whole elaborate system of specimen-stealing, with the necessary attendant system of spying, stripping, and searching. The reduction of the expense of ore extraction amounted in this way to forty, fifty, and even sixty per cent.

The new powder was gradually introduced, and its full advantages, and the revolution in the organization of the shift which it involved, were not at first apparent. It is one thing to use Giant powder now and then for single blasts, and quite another thing to organize all the operations underground with reference to its use. So it came to pass that the miners received it at first with favor. Those of them who had taken contracts for drifting or sinking found great profit in its use, and were in some cases allowed to take it freely from the magazines of the mine, as it was thought they would in this way grow familiar with it. After this was forbidden (on account of the high cost of the powder, and the too free use of it by the "contractors"), they begged and stole it whenever they could. At the same time it was employed by the ordinary shift-miners for some eight months without serious complaint. But finally, all on a sudden, the Miners' League demanded its exclusion from the mines, alleging that it was injurious to health, and coupled with this a demand that the distinction between surface laborers and miners underground should be abolished, and that these classes of workmen should be paid alike—a thing absurd in itself, and unheard of in Grass Valley hitherto. I need scarcely say that the miners did not ask to have *their* pay *reduced*, for the sake of uniformity, but to have the pay of the laborers *raised*. The secret of this unexpected attitude is the discovery that Giant powder, besides cutting off the perquisites of labor, is dimin-

ishing the number of miners necessary for a given production, and so far simplifying the labor of these as to require less skill, except on the part of foremen and powder-men. Of course the natural effect would soon be the reöpening of a vast number of mines now idle, and an increased demand for really good workmen at high wages as foremen. Only the shiftless, lazy, and ignorant workmen suffer in the end by the progress of the industrial arts, but unfortunately that is the very class which the Leagues are too apt to foster and protect. Nothing is more fatal to the true interests of labor than the notion that skill should make no difference in wages. To pay (as the Grass Valley miners demand) the man who pushes a car or loads a wagon above ground the same as one who drills, blasts, or sets timbers underground, is either to underpay the one or to overpay the other; and certainly, at all events, to remove from both the stimulus of ambition and the motive to excellence.

In the strike at Grass Valley, the League was too late. On general grounds, there is not a region in the country where miners have had less reason to complain. Employment has been for many years both steady and well paid. No attempt was made at this time, or talked of, or intended to reduce their wages. Even the murmurs about Chinese labor, which have grown alarmingly bold in many quarters, were not heard in this quiet paradise of employés until provoked by the last folly of those who did not know how to let well-enough alone. And as to the sole plausible reason for a strike—the alleged injurious effects of Giant powder—the League was, as I have said, too late.

Is the use of Giant powder injurious to health? Certainly not more so, if at all, than it was last year, and for several months of this year, when the miners were anxious to lighten their labor, and increase their profit, *on contract work*, by its employment. Certainly not more so than when they fired their own blasts, instead of having a man to do it for them. It is only, it would seem, when the miners are excluded from the stopes, after the shots are fired, that they find out how terribly noxious (in spite of the *alibi*) are the gases into which they were ready to go without inconvenience to overhaul for rich specimens the freshly broken quartz.

Curiously enough, moreover, it so happens that the Giant powder, as now manufactured, is far less likely to be in any way noxious than it was when considered harmless. It is manufactured with greater care, and upon explosion leaves almost no visible smoke. Now, the smoke is all that can reasonably be expected to cause pain or annoyance, as a little consideration will show.

Nitro-glycerine or Glonoine has long been a homœopathic remedy for a certain kind of headache, and in larger doses it produces this headache as a pathogenetic effect. Rubbing it upon the skin will have the same effect as swallowing or inhaling it. But after combustion, this organic compound is transformed to inorganic gaseous products which do not possess the same properties; and, in fact, when diluted with air, in a decently ventilated mine, should be no more harmful than the gases of any combustion.

The headache experienced by those who employ nitro-glycerine in any form as an explosive, doubtless arises from the presence in the air, after explosion, of particles of the original substance, not consumed, just as in the smoke of powder we have an evidence of imperfect combustion. The less visible smoke remains, therefore, after a blast of Giant powder, the less time will be required for its effects on the air to disappear. Proper adjustment of the charges to secure absolute combustion is a matter bearing directly on the same point. Few mining captains have yet found out how small a charge may be advantageously employed. The almost universal mistake in the use of this explosive is over-charging the holes. (*The useful effect of a blast does not increase in the ratio of the amount of explosive*—least of all when the explosive is a *quick* one.) Even if Giant powder gave noxious fumes, the evil could be reduced to a minimum, and would be far less serious than those experienced in quicksilver, arsenic, or even common metallurgical works.

But the general evidence is that, after becoming accustomed to Giant powder, no one suffers from it. If there are a few so constituted as to be always affected by it, what of that? Some people are always sick when they ride backward; some when they go to sea; some when they smell camphor. Many soldiers cannot, without injury, attend upon artillery practice. But I fancy there will be stages and ships and camphor and cannon for all that.

If the use of Giant powder were universally and seriously and unavoidably injurious to health, it might be forbidden by law. But there is no possibility of that prohibition. The facts are all against it. The Chinese used nitro-glycerine (which is chemically the same thing) in the Central Pacific tunnels, and they are not afraid of it. Now, if it is so fatal as the League asserts, why does not the League embrace the opportunity to kill off the Chinese by allowing them to work with it underground? The fact is, Giant powder may prove malarious to miners' leagues, but not to miners.

This is part of the great labor struggle in the Pacific Coast—a struggle which marks the terminus of the era of mere speculation. For years the miners have been begging for the assistance of capital to erect their industry into a regular business. Now they have their wish, and the first requisite of a business must be complied with. The owners of mines must be free to work them as they choose, and with what force they choose. If a steam-engine will pump for five dollars where two men and a bucket cost ten, the engine must be erected. If the cheaper machine is a Chinaman, instead of an engine, why should not the Chinaman be erected?

Unfortunately, demagogues are trying to make this a question of party politics, since one class concerned has votes, which are worth conciliating. But the best men of all parties are agreed on many points involved, and the foolish stubbornness of the laborers and miners is rapidly forcing an agreement on all. Persecution of the Chinese brings protection of them; the exactions of leagues and unions bring Chinese labor; and unless the madness of other foreigners abates, the people will be forced, sooner than a calm wisdom would desire it, to let the Chinese defend their labor with their votes.

R.

SAN FRANCISCO, July 19th, 1869.

New-Jersey Railroad Matters.

THE topic of conversation in business circles in the North-eastern section of New-Jersey is the extent and number of its railroad enterprises; and indeed the importance of the subject entitles it to all the consideration it has received. When all of the railroad-lines now building shall be completed, the Eastern section of New-Jersey, from Cape May to Fort Lee, for a distance running on an average twenty miles inland, will be more completely intersected by railroad-lines than any other tract of equal extent in the country. The roads of recent inauguration have been noticed in the *Tribune* already. The extension of the Morris and Essex road to Paterson; the erection, under the auspices of the Erie road, of the line between Newark and Paterson; the Seashore road, to run from Cape May and to connect by ferriage with this city; the line which is to traverse the charming valley of the Passaic to Peapack; and but yesterday that other great enterprise of the Erie Railroad Company which is eventually to compete for Hudson River and Western traffic with the Hudson River line, and of which the construction of a road between Fort Lee and Bergen Tunnel is but the incipiency. To the people of this city, these enterprises of a contiguous district cannot be uninteresting, and the facts concerning them are explicitly stated.

The Montclair Railroad is being constructed from Montclair to Morristown, under a charter which authorizes its extension in a north-westerly direction to the State-line near Middletown. It has also secured control of a charter which empowers the building of a line across Munson's Gap at Snufftown, near Franklin, where it will connect with the New-Jersey road. Its right to run over the line of that road to the ferry at the foot of Montgomery-street, in Jersey City, has been secured for five years by contract. The Company has also contracted with the New-York and Oswego Midland Company to build a road from the State-line to the Hudson River. The Company is now engaged in locating this road, much of the right of way having been purchased. Work is being pushed from Little Falls to a place known as Pompton Plains, ten miles distant from Paterson. Thence it will be vigorously pushed on up the Pequannock River to Snufftown, and thence through Ogdensburg, Franklin, and Deckertown, to Middletown, N. Y. This line will lead the road through a district rich in some places in iron and zinc mines, and in others in agricultural capacity, and opens the Pequannock valley, now comparatively unknown. The gentlemen connected with the enterprise propose to lay out several town-sites along the line of the road, and to invite settlement by offering to all willing to purchase and build upon them, for themselves and their families, free passes over the road for a year. The erection of a fine manufacturing city on the Rampoo River, near Bloomingdale, is deemed probable. The Hard-Rubber Manufacturing Company of New-York have purchased a tract of land with magnificent water-power there. The Erie Railroad Company is one of the first that has made substantial improvements in the vicinity of New-York to accommodate its large business. It is at present erecting a large depot and freight-house at the foot of Twenty-third street, which point is now connected with the Company's depot in Jersey City by a regular line of ferry-boats. Docks and warehouses and new tracks are being laid at Weehawken and the Long Dock, and a depot for receiving crude oil from Pennsylvania has been erected at Penn Horn. The oil traffic is very large, 120 cars sometimes passing over the road in one day. Large iron receiving-tanks, and other reservoirs, built for storing the oil, have been constructed, which will insure for the Erie Railroad, doubtless, the monopoly of this branch of traffic, since its capacities for carrying and storage are better than any road can well possess. The Company has also purchased lands, and are opening stock-yards at Weehawken, to rival the Communipaw Abattoir as a depot for holding and slaughtering cattle. The movements of the New-Jersey Road toward completion, with other lines for Western trade, have been already noticed. The combination with the Pennsylvania Railroad has already secured for it a large share of Western traffic coming to this city. The Pennsylvania Railroad Company has also, in the interest of itself and the New-Jersey Railroad, hired the Pittsburg, Fort Wayne, and Chicago Railroad, which connects at Pittsburg with the Pennsylvania road, at an annual rental for 999 years of $1,380,000. In addition to this, the leasing roads assumed the liabilities of that leased. The companies, it is said, are quietly absorbing the stock of the Chicago and Rock Island Railroad, and have some design, it is reported, of securing the control of the Chicago and North-Western Railroad. From the Western terminus of one of these roads the connection will be extended to Omaha. The connection with the Pacific Railroad will then be insured, if possible. It is intended that this connection shall be secured by the close of this year.—*New-York Tribune.*

English Railway Management.

THE following statement of the number, causes, and results in killed and wounded, of reported disasters upon the railways of Great Britain and Ireland, during the year 1868, will be found of suggestive interest both to railroad-men and the general reader in this country. The statistics are taken from the *Pall Mall Gazette:*

	NO. OF KILLED.	NO OF INJURED.
CAUSES BEYOND THE CONTROL OF THE SUFFERERS:		
Passengers	40	519
Servants of companies or of contractors	19	47
Total of unavoidable casualties as regards sufferers	59	566
CAUSES ORIGINATING IN THE MISCONDUCT OR WANT OF CAUTION OF SUFFERERS:		
Passengers	22	6
Servants of companies or of contractors	64	18
Total of avoidable casualties as regards sufferers	86	24
Sufferers by level crossings	14	3
Trespassers	41	4
Suicides	8	—
Miscellaneous	4	3
Total not classed with reference to controllable or uncontrolled causes	67	10
Grand total	212	600

"Of the year's aggregate of casualties (deaths and injuries) three fourths were unavoidable as far as the sufferers themselves were concerned. Only one eighth (eighty-six deaths and twenty-four injuries) is ascribed to what may be termed causes controllable by the sufferers. More trespassers, it will be seen, were killed than passengers classed under 'causes beyond the control of the sufferers;' indeed, fully twenty per cent of the deaths arose from trespassing on the permanent way. 'Trespasser run over and killed' constantly catches the eye as it runs down the list of accidents. Level crossings, which in the early days of railroads were not sanctioned by Parliament, are very fatal in their consequences, especially to children. Such records as the following are constantly recurring: 'A little girl struck by a train and killed at an occupation level-crossing at Cefn station.' 'Child three years old run over and killed whilst playing on the line near Hendrefooyan.' 'A child run over at an occupation level-crossing between Twickenham and Teddington stations.' This child was not killed on the spot—only had one leg cut off. 'Boy run over and killed at a foot level-crossing near Twickenham.' 'A little girl run over and killed at a public carriage-road level-crossing near Brockenhurst station.'

"'The extracts just given relate to English or Welsh lines. No similar casualties to children are reported from Scotland, but from Ireland there is one—'a child six years old run over and killed at a private level-crossing between Monaghan and Glasslough.' The price in human life, to save railway companies the cost of continuing the ordinary highways by means of bridges over their lines, was this year fourteen men, women, and children slaughtered on the spot. Of the passengers who lost their lives last year by 'train accidents, thirty-one perished by the horrible Abergele catastrophe.

"Naturally, the public is most concerned to ascertain the circumstances of train accidents—casualties to the trains when in actual transit. To passengers and to goods trains 101 separate accidents are returned for the year; 43 were collisions, causing 37 deaths of passengers, and more or less injuring 382 others. Trains getting off the rails killed 2 and injured 27 passengers. What is the chance of death or of injury to passengers from train accidents? The mean annual number of passengers using the railroads of the United Kingdom during the three years ending with 1867 was 271,390,000; the mean annual deaths, 34½, or one death to about every 8,000,000 passengers; the mean annual number of injured was 761, or one to every 356,000 passengers who started."

The Seasoning of Timber.

BY DR. ADOLPH OTT.

THE fact that dried timber is, for nearly every purpose, far superior to green, has led to its being dried in the open air, or in confined rooms by means of heated air, or mixtures of air and steam. The first method is termed seasoning. Newly felled wood, in order that it may season properly, should be protected from rain, sun, and strong winds. It should be piled up so that a circulation of air can take place from beneath.

The shed in which the timber is dried should be paved and provided with sewers. Moreover, the relative position of the pieces of timber should be changed from time to time during the seasoning process. The necessary time for seasoning varies from two to four years.

The proportion in which the woody fibre and water are to each other is very different. It varies according to the degree of dryness and the nature of the wood itself. According to Schübler and Neuffer, we have for newly felled woods the following table:

WOODS.	WATER.
Hornbeam	18.6 per cent.
Willow	26.0 "
Sycamore	27.0 "
Ash	28.7 "
Birch	30.8 "
Oak	34.7 "
Pedich Oak	35.4 "
White Fir	37.1 "
Pine	39.7 "
Red Beech	39.7 "
Alder	41.6 "

Asp,	43.7 per cent.
Elm,	44.5 "
Red Fir,	45.2 "
Lime Tree,	47.1 "
Italian Poplar,	48.2 "
Larch,	48.6 "
White Poplar,	50.6 "
Black Poplar,	51.8 "

The amount of water in wood, after one year's drying in the air, ranges from 20 to 25 per cent, and when perfectly air-dry, as it is called, it still holds from ten to fifteen per cent.

The specific weight of newly felled timber ranges from 0.85 to 1.05; that of air-dried timber from 0.45 to 0.75. The weight of one cubic foot of newly cut native timber would thus range from fifty to sixty-five pounds, while that of seasoned wood would vary from twenty-eight to forty-seven pounds. The total expulsion of moisture by means of air-drying, according to the experiments of Rumford, takes place only at 280° Fahrenheit. But even if thus completely dried, and then exposed again to the atmosphere, it absorbs nearly five per cent of water during the first three days, and continues to absorb until it contains from fourteen to sixteen per cent, after which it becomes very hygroscopic, losing or absorbing water according to the state of the atmosphere. Indeed, it appears that this property is never entirely removed. According to the author of an article on "Wood" in *Appleton's Dictionary of Mechanics*, some bog oak, supposed to have been buried on the island of Sheppy not less than a thousand years, was dried for a good many months, and then used for the manufacture of furniture. When divided into the small pieces required for the work, it was still found to shrink. With regard to the shrinkage after one year's seasoning, it ranges from five to twenty per cent, and after a seasoning of four years from thirteen to thirty-two per cent.

W. W. Bates, of Chicago, Ill., contributes the following data upon the shrinkage of green North-Carolina live-oak, cut at different seasons of the year, in the Report of the Commissioner of Agriculture for the year 1866.

The shrinkage after one year's seasoning was as follows:

Loss of weight in summer-cut logs, in bark,	5 per cent.
Loss of weight in winter-cut logs, in bark,	6 "
Difference in favor of summer-cut logs	1 per cent.
Loss of weight in summer-cut squared timber,	5 per cent.
Loss of weight in winter-cut squared timber,	5 "
Difference,	0 per cent.

The shrinkage after four years' seasoning gave:

Loss of weight in summer-cut logs, in bark,	23 per cent.
Loss of weight in winter-cut logs, in bark,	27 "
Difference in favor of summer-cut logs,	4 per cent.
Loss of weight in summer-cut squared timber,	23 per cent.
Loss of weight in winter-cut squared timber,	22 "
Difference in favor of winter cut timber,	1 per cent.

The drying of lumber in confined rooms by means of hot air, or steam and air alternately, is now largely practiced, and the more on account of the economy of the method than on account of its yielding a superior product. In some cases, the wood, before being exposed to artificial heat, is subjected to a longitudinal pressure, in order to rupture the cells in which the moisture is confined, to the end that it may escape more freely upon the application of heat. It is claimed that the wood is thus rendered more valuable for nearly all the purposes for which it is used, but particularly for the hubs, spokes, and panels of carriages, etc.

Inauguration of the New Western Dock at Hull.

THIS new dock has been opened by the Prince and Princess of Wales. It is 3300 feet long, is of a somewhat singular shape, being 430 feet broad at its widest part, and only 180 feet wide at its narrowest part. Its area is 23a. 0r. 1p., so that it is one of the largest docks in the empire. There is a large amount of quay space all round the dock, and the average width of the quay is 100 feet to 150 feet. On the north side, not far from the entrance to the dock, Custom-House offices will be built, and it is also proposed to erect in succession several warehouses and sheds, the first of which is being carried out under the superintendence of Mr. R. A. Marillier, resident engineer. Considerable difficulty has been experienced in getting a good foundation, and the walls of the dock have been laid in some places on no less than 20 feet of concrete, and in other places on 8 feet of concrete. The whole of the hydraulic machinery has been supplied by Sir W. G. Armstrong & Co., of Newcastle-on-Tyne, and it has been fixed under the superintendence of Mr. C. Waure. Mr. W. McCormick has been the general contractor for the dock works. The engineer, who designed the dock and its appendages, was Mr. J. Hawkshaw, who has been assisted and represented by his son, Mr. J. C. Hawkshaw.—*London Builder.*

Lighting Mines with Gas.

IN improving the method of lighting mines, Messrs. M. Wilkin and J. Clark, of Paddington, propose to use lamps, burning gas, oil, or other illuminating materials, with air propelled from a pure source at the bottom or top of the shaft, through air-tight tubes, to the interior of the said lamps. An overplus of air they cause to blow gently out by escape-valves or covers near the top of the lamps, thereby preventing the entrance of foul air, or air which has become mixed with fire-damp. By preference, they glaze the lamps about half their height with glass: the upper half they prefer to make of sheet-metal to withstand the heat. When gas-lamps are used, the gas is produced and conveyed in pipes in the usual way. The air is propelled through the tubes referred to by any well-understood method; such as by fans, air-pumps, steam-jet, etc. In lighting the lamps, they propose to use safety-matches, such as those manufactured by Bryant & May. After the match is inserted into the lamp by an escape-valve, it is struck, and the lamp is lighted, while the match is extinguished in a tube into which it is thrust.—*London Builder.*

Nitro-Glycerine in England.

SIR JOHN HAY has introduced into the British Parliament a bill to prohibit, for a limited period, the importation, and to restrict and regulate the carriage, of nitro-glycerine; and this bill has already passed a second reading. The necessity for some legislative interference has been repeatedly insisted upon, and the late explosion in Wales gave point and weight to the arguments on the subject. The intention of Sir John Hay's bill, which is to take effect from the first of October next, and to continue in force for the period of one year, is absolutely to prohibit the importation of nitro-glycerine, or of any other substance having nitro-glycerine in any form as one of its component parts or ingredients. This provision will necessarily drive those who may wish to employ nitro-glycerine dynamite for blasting purposes to manufacture the material for themselves; and in order that this may be done, with due regard to the public safety, the conveyance and storage of the substance must be brought within certain restrictions. In Sir John Hay's original bill it was provided that the manufacture should be carried out within one mile of the place where the nitro-glycerine was to be used, and it was made unlawful to convey the substance a greater distance than one mile, whether by land or water. In place of the restriction as to distance, it is now proposed to enact that no person may carry nitro-glycerine without a license; but with such a license nitro-glycerine may apparently continue to be carried from one end of the United Kingdom to the other. The original bill was defective in one important particular; it placed no restrictions upon the storage of nitro-glycerine, and there was nothing to prohibit the accumulation of any quantity of the material at or near mines and quarries which might be in the immediate neighborhood of towns, high-roads, etc., and would almost certainly be situated in populous neighborhoods. In the amended bill, the storage of the material is brought within the licensing clause; and the manufacture, storage, and possession of nitro-glycerine, except under license, and under certain regulations which are not specified, will be unlawful. The original design of Sir John Hay's bill has been departed from. The essential principle of that bill was to render it a matter of necessity for those who desire to use nitro-glycerine, or any preparation of the same, to prepare it as they want it, at or near the place where it is to be used; and all that was needed to give completeness to the bill was the introduction of certain provisions limiting the quantity of nitro-glycerine to be stored at any one time in any one place, and requiring the observance of certain precautions on the part of storekeepers. The amended bill proceeds upon the totally different principle of allowing the manufacture of nitro-glycerine to be carried out without reference to its ultimate destination and use; and the safety of the public is made to depend upon the compliance of individual manufacturers with the terms of a license, certain regulations liable to be varied and revoked from time to time, as expressly provided in the bill, by the Home Secretary.

Railroad Items from the South.

THE Charleston and Savannah Railroad is rapidly approaching Grahamsville, and will probably reach that point by November next. It is hoped that this line will soon be reöpened to Savannah, and its track, etc., destroyed by the operations of the war, replaced and put in fine condition.

THE Albany and Brunswick Railroad will doubtless be put under contract within a few months, as we learn that satisfactory arrangements have been made to secure the necessary funds. This line will go through to Eufaula, Ala., and its construction is intended to afford a line competing with the Georgia Central combination, from the Alabama cotton-fields to the Atlantic at Brunswick, Ga.

THE Savannah, Griffin, and North-Alabama Railroad is assuming a lifelike condition. This line runs from Griffin, on the Macon and Western Road, to a point, as yet undecided, connecting with the road from Chattanooga to Memphis. It will pass through the rich mineral regions of North-Alabama and some fine cotton-lands in that State and also in Georgia. A large amount of grading was done on this line before the war, and the first twenty miles will soon be under contract.

THE Savannah and Memphis Railroad is starting operations. The first twenty miles will be put under contract on the first of September. This line connects Opelika, Ala., with Tuscumbia, on the Memphis and Charleston Railroad, and will afford, when completed, a very direct route from Memphis to Macon, Ga., where there are two outlets to the Atlantic—one to Savannah, and the other to Brunswick. A large amount of grading was done on this line before the war—it will pass through the mineral region of North-Alabama.

THE Montgomery and Eufaula Railroad is pushing ahead rapidly, and track-laying is going on at a rate that will soon place Montgomery and Eufaula within a few hours' ride of each other. This line runs through a fine cotton belt and also some of the finest pine-timber lands in the world.

WORK on the South and North Alabama Railroad is progressing rapidly: about 600 hands are at work between Montgomery and Lime-kiln, the point where the line intersects the Selma, Rome, and Dalton Road. This South and North road will connect Decatur, Ala., with Montgomery; affording all-rail communication between Chicago and Mobile, as soon as the bridge is completed over the Ohio at Louisville, which will be some time this year. This line passes through the rich mineral regions of Northern Alabama. The bridge over the Alabama River, about three miles from Montgomery, is to be a triangular truss, the draw of iron, and the permanent or fixed spans of iron bottom cords, and the balance wood. The Louisville Bridge and Iron Company are to put up the bridge.

THE Western Railroad of Alabama is proceeding rapidly toward completion. Track is laid for sixteen miles from Montgomery; twenty-one miles remaining to be laid to the Alabama River. The bridge across this stream on this line will be a novel structure. The contractors are Maxwell, Grant and Co., of Macon, Ga. The piers are of wrought iron, on a plan patented in December last by Edward M. Grant, C. E., of the above firm. They rest upon heavy masonry, foundations about ten feet in height, and the total distance from the bed of the river to grade will be about seventy feet. The superstructure will be an original design, by Mr. Grant, being entirely of wrought iron, and of a new pattern.

The entire structure, being novel in its character, is attracting considerable attention of engineers and railroad men generally. We hope to give a complete review of this structure when it is completed, with cuts, etc., illustrating the designs. The grading between the bridge site and Selma is nearly done, and the line will be open for business this year. It is the only link wanting to complete an all-rail uniform gauge route from Vicksburg to Savannah, and Brunswick on the Atlantic Coast. This route is on the direct line from San Diego, Cal., to Savannah, and it is intended to make it the "grand trunk" of the Southern Pacific Road, branches running, of course, to New-Orleans, Memphis, and St. Louis.

THE Blue Ridge Road, connecting Knoxville, Tenn., and Anderson, S. C., is under contract with James M. Sellers, of Pennsylvania, and two associates to complete it. At Anderson, they have railroad communication with Charleston and Savannah. This will be a very important line.

THE road from New-Orleans to Mobile is rapidly approaching completion, and it is expected that it will be open for the cotton traffic of 1869. Six steam dredges are used in throwing up the embankment across the Rigolets swamp. The material is found to be pure *peat*, and great precautions are necessary to prevent the road-bed from catching fire before it is covered with the heavy coating of sand it receives, in order to protect the foundation from sparks.

Chloride of Nitrogen.

MR. ABEL has recently discovered the curious circumstance that the explosion of perfectly dry chloride of nitrogen in an open vessel produces comparatively slight destructive effects. A drop exploded on a watch-glass, for example, only breaks the glass into two or three fragments, while the same quantity of chloride of nitrogen, if wet, shatters the glass to atoms. The thin layer of water, in fact, acts like the water tamping used with nitro-glycerine in a drill-hole. Chloride of nitrogen has only been the subject of some researches by MM. Deville and Hautefeuille. As is well known, it is exploded by friction, by percussion, by contact with grease, and by heat, and, in our experience, sometimes goes off without any obvious cause at all. Owing to the extreme danger attending experiments with it, the exact degree of heat at which it explodes has never been ascertained, but the chemists named above have determined that it can be made to boil without exploding. As regards the force exerted by the explosion of chloride of nitrogen, the same gentlemen have ascertained that when exploded in confinement, the pressure of the gas liberated cannot be less than 3500 atmospheres. This is an interesting scientific fact; but chloride of nitrogen appears to be so capricious and unstable a body that no profitable use is likely to be made of the tremendous energy it is able to develop.—*Mechanics' Magazine.*

Queries.

E. R. A., OF N. Y., asks us what is the best or rather the standard form of barometer? The form adopted by the Smithsonian Institute, and employed in all the observatories of this country, consists simply of a glass tube enclosed in a second tube of brass, the latter being provided with slits on opposite sides, so that the index may be very accurately adjusted to the upper surface of the column of mercury. The details would require an engraving for their perfect explanation. The various devices employed for enlarging the scale—as, for example, inclined tubes, wheels, etc.—are all worthless.

MAGNET, OF N. J.—The device which you describe for insuring the insulation of coils through which powerful currents pass—namely: immersing them in turpentine—is somewhat old and very effective. Turpentine is nearly as good an insulator as glass. When a spark passes through a solid insulator, a hole is left; but in a liquid like turpentine, the hole immediately fills up, and the insulation is as good as ever.

M. B. C., OF MO.—If you will take a small bell and test it, you will find that different weights of clappers produce different effects, and so does the material of which the clapper is made. In large bells, we believe the rule is to make the clapper one fortieth or one fiftieth of the weight of the bell.

Trip Through the Hoosac Tunnel.

THE tunnel through the Hoosac Mountain in Massachusetts is now more than a mile in length, and after numerous delays and litigations the work is again making good progress. A correspondent of the Rochester (N. Y.) *Union* writes an interesting account of a trip through the tunnel in the last week of July. He says:

"Before entering the mountain, we examined the works at the river's side by which the tunnel is making its way toward North Adams. We found, in a building called the 'Compressor House,' four immense air-condensing machines, each working four cylinders, by which air is driven through a pipe more than a mile into the tunnel, and there made to do the work of steam in drilling the rock at the 'heading,' as the remote end of the tunnel is called. Such a wheezing, puffing, and groaning you never heard air make. And no wonder. It was obliged to be crowded into an immense number of atmospheres, and made to travel 5700 feet through an eight-inch pipe, and jerk and twist a steel drill into a vein of quartz rock almost as hard as adamant. It labored very severely to do this work, so when we get our short trunk line from Rochester to Boston, we cannot be too grateful to the vigorous air which gives us the Hoosac Tunnel. We must also thank Deerfield River, which is all used up in working the compressors. More thoroughly is it absorbed by the canal from the dam above the tunnel than is the Genesee River often absorbed by our Rochester mills in midsummer.

"Having seen the instruments which are boring the mountain and are hastening the cessation of the stage ride you enjoyed so much, we returned to the opening of the tunnel over the immense pile of work called 'the dump,' a stone hill several hundred feet long and sixty high, the debris of the blasting in the mountain. The train was about to start for the 'heading.' The 'train' consisted of three cars, each about two feet high, trucks and carriages, six feet by four in horizontal shape, drawn by a weary-looking white mule named 'January' (from his snowy appearance, we suppose), who was superintended by a most active and dirty small boy. The third 'gang' was then on its way to relieve the second. They were our fellow-passengers. Off we started with a jerk by 'January' and a yell by the 'small boy,' and like a leap from the tropics to the arctics, from day to night, from sunshine into a cascade, we darted into the coldness, blackness, and drippings of the Hoosac Tunnel.

"The sudden change from a temperature of 80° to that of 52°, which is the unvarying temperature of the tunnel the year round, was at first very disagreeable. The constant percolation of water through the shallow rock at the entrance was a disenchanting surprise. The darkness was expected. Our lantern did us good service, however, and very soon the temperature became pleasant; and as the rock got thicker, the water ceased dripping. Then the weird experience of an underground journey commenced. On we went into total darkness. The hollow, rumbling sound of the cars intensified the activity of the whole nervous organizations of us novices. Imagination worked hugely and fearfully. On for eighteen hundred feet through a hole twenty-four feet by arched twenty feet we went, when, like stars through a dim mist, some lights appeared in our front, and our small boy kept up an unearthly yelling, which he afterward called 'the whistle of his engine.' In some dim and seemingly unnatural way we rolled past a 'gallery' holding workmen, who, I afterward understood, are the 'finishers' of the tunnel, on into the darkness again, our mule looking like a ghost, and we feeling like denizens of another and very strange world.

"Every influence seemed to conspire to produce terror and excessive unearthliness thenceforth. From the first 'gallery' for one thousand two hundred feet the tunnel is not quite finished, and the projecting rocks eighteen or sixteen feet above us glided, through the gloom and our lantern-light, in a way no one can imagine who has not seen them. Dusky and fearful they seemed to move toward us, threatening us with injury. But about three thousand feet from the entrance our journey changed into something we are glad now to have experienced, but which we do not at all care to experience again. The second 'gallery' was passed. The shape of the tunnel changed. The roof came down ten or twelve feet. And we were going on at full speed with the jagged rock roofing us only about four feet above, and sometimes not so far off as that.

"For nearly 2700 feet we thus journeyed, stooping down to the bottom of the car, and feeling almost a sense of suffocation. I assure you your journey, 1500 hundred feet overhead, just then, was a thousand-fold more pleasant to you than was ours to us. We would have exchanged places with you no one can tell how gladly. It may be very well for professionals to go into the mountains in our way, but it is terrible for those who have never done such a thing before. Our mule, small though he was, crouched as he ran, and we each moment bent lower in fear of the rocks, which seemed to be ready to sweep us off the cars. At last we stopped about three hundred feet from the 'heading,' in the midst of some thirty or more dingy-looking operatives, each of whom held a candle in his hand or had it attached somewhere to his body.

"We got off the cars, trembling with the excitement of the journey, and, though we had been prepared for it, there was a flash of light, and down we almost fell to the rocky floor. The tunnel-blasts had been fired. Our ears were stunned as by the explosion of a battery of sixty-four-pounders ten-fold intensified, and the stricken air rushed by us as the gust of a tempest, while off up through the mountain reverberated the sound like oft-repeated thunder. Our party bore it well. A few days before our visit, some ladies fainted at the shock. The blast was repeated. Forty drillings were exploded. We then went forward to the 'heading.' About two hundred feet from it were the drilling-machines, and in front of them two heavy gates, placed partly across the tunnel to prevent rocks from being thrown too far toward the workmen. Near the gates was the galvanic-battery used for firing the blasts which are exploded six times a day. About one hundred feet from the 'heading' was a rock several hundred pounds in weight. It had been thrown so far from the blast. We clambered over the ruins five thousand seven hundred feet from the tunnel's entrance, and pulled out some of the quartz through which the drills are now making slow progress, and hurried to the cars.

"We got back to open air as soon as possible, concluding we would much rather follow you over the mountain than try to get any further through it. Our way out was beset with perils, not the least of which were two nitro-glycerine explosions at the first 'gallery,' which blocked our road so that we were obliged to climb over the debris and walk the rest of the way to the outer air. As we emerged into daylight, dirty and nervous, the heat was oppressive and dispiriting; but we were grateful for our deliverance, and glad we had had a safe 'adventure,' which was an adventure indeed.

"In about four years the way will be made through the mountain, and not till then can one go under it as well as over it. Talcose slate is hard to penetrate, especially when there is so much quartz and spar injected through it as there is at Hoosac. There are two hundred and fifty men east and west of the mountain, working toward each other night and day. The central shaft, which you saw on top of the mountain, is to be 1030 feet deep, and the workers are down now about 700 feet. Next spring the central shaft will be finished to the grade, and in it the tunnelling will go off west and east also. Now about twelve feet a day is made; then about thirty feet a day will be accomplished. In one year less than the contracted time the whole work will be finished, and the Springfield road east will not compare for beauty or speed with the Hoosac Tunnel route.

"By faith even mountains can be removed and cast into the depths."

Galvanized Iron Tiles.

A NEW kind of metal roofing has been introduced in France. The covering, instead of being continuous like corrugated iron, zinc, or lead, is composed of separate tiles formed of galvanized iron, and shaped somewhat like our ordinary pantiles, but susceptible, of course, of various forms, according to convenience or fancy. These tiles are remarkably handy. The metal being thin, they are easily cut to fit a sloping line of roof, corners, etc.; and they are fastened by a single nail of galvanized iron, with which is used a small leaden washer, to render the nail-hole perfectly tight The advantages of such tiles are numerous. In the first place, they are not affected by fire, like zinc; they do not oxidize, and their dilatation and contraction have no effect on the roof. They cost from 3f. to 3f. 25c. per square metre, with 50c. for laying, making in all 3f. 50c. to 3f. 75c. without the scantling. This is about half the cost of a zinc-covering. If the new tiles presented any tone or picturesqueness, we should recommend them strongly; as it is, we think nothing could be better adapted for roofs which are out of reach of the eye. Their lightness and durability are invaluable qualities. It is right to add that the new tiles are patented by a company at Montataire.—*London Architect.*

The Heat in India.

THE *Friend of India* says: "Heat, such as we have not known in the past fifteen years has been making life in the plains of India an intolerable burden. When the thermometer rises above 88°, as it does for six weeks every year in Bengal, life becomes a mere toleration of existence. But this year there have been few afternoons of late which have not seen it at 96° and even 97° in the coolest rooms. The cyclone of the 9th was thought to have brought the great monsoon, but it has only added moisture to heat, and made matters worse."

MINING SUMMARY.

Colorado.

THE MINES AROUND CENTRAL CITY.

THE *Register*, speaking of the recent improvements in the management of the property of the Central Gold Mining Company, says:

"A few weeks since, Mr. Theodore H. Lowe took charge of the property, since which time two new stulls have been put in, and other necessary timbering done, greatly improving the safety of the mine, and, when some other necessary improvements now in contemplation are finished, the mine will be in excellent condition for safe and economical working. At present, the ore is being raised from the lower to the second level by a hand-windlass, whence it is conveyed in wheelbarrows, a distance of some forty feet, to the main shaft, where it is dumped into buckets and raised to the surface by horse-power. The main shaft is to be sunk at once to the present depth of the lower level, about 170 feet from the surface, and other levels driven east and west on the vein, which will open a large territory for backstoping, and the ore can be mined and raised for about half the present cost. The crevice, in the west end of the lower level, is fully seven feet between walls, and, at the time of our visit, showed a vein of solid smelting ore—zinc blende and peacock copper ore—fully three feet wide. This, we are informed, sells for $40 to $50 per ton at the mine. The balance of the crevice is filled with gangue-rock, carrying streaks of ore similar in character to the smelting ore, the whole mass of which yields an average of six ounces of gold per cord, under stamps. Since Mr. Lowe took charge of the company's works, he has repaired and refitted the old Lexington mill, which is owned by the company, started it up, and on Saturday evening last he showed us a fine lump of retort, weighing sixty-six ounces, the result of his first week's run, on ore from the company's mine. This proves that, by judicious management, their mine can be made to pay a good profit."

We take from the same paper the following account of the property of

THE SMITH & PARMELEE COMPANY:

"FOR several years past, and, in fact, almost ever since the first settlement of the country, the Smith & Parmelee mine has been one of the most celebrated, as well as the best paying mines in the country, and to-day it promises quite as well for profitable working for an indefinite number of years in the future as it ever did. Yesterday we visited and examined the works both above and below ground, and found them in much better condition than we had expected. We visited the mine some six months since, at which time both the mill and mine were in very bad condition—engine out of line, stamps so badly worn and out of repair as to render it almost impossible to run them at all, but little ground open in the mine, and some of that already worked out was left in a very unsafe condition for want of proper timbering. About this time, Mr. B. F. Wells, the present Superintendent, took charge of the works. His first official act was to put the underground work under the control of an efficient mining captain—Mr. T. R. Saunders—with instructions to secure the dangerous portions of the mine, and open out new ground as fast as possible. Since that time, the main shaft has been sunk 130 feet, making its total depth 550 feet, and the 450-foot level extended so as to open a large territory for both back and underhand stoping. The 500-foot level has also been driven east from the main shaft about 100 feet. As is well known to most persons conversant with the mines of this region, there are two distinct veins in this mine—one called the Briggs, and the other the Gregory. That on the southeast is called the Briggs, and is by far the largest vein, and the one on which the main shaft is sunk. These two veins were together at the surface, and were worked as one vein to a depth of some 50 feet, when they commenced to diverge quite rapidly, the one dipping to the southeast, and the other to the northwest, and, at a depth of 260 feet from the surface are 70 feet apart, and still diverging. At the above depth, a cross-cut has been run from the Briggs to the Gregory, and a level opened 80 feet in length, where both back and underhand stoping is going on, and a large amount of ore being broken. The pay-vein in this level is from twenty inches to three feet in width, carrying a considerable quantity of rich smelting ore, that sells at $125 per ton at the mine.

"In the 450-foot level, which is now in 180 feet east from the main shaft, the pay-vein is from three to eight feet wide, and also carries a considerable quantity of smelting ore, that sells for about $60 per ton. No ore is at present being broken in the 500-foot level, but the pay-vein is about the same in width and character as that in the 450-foot level. In the bottom of the shaft, the vein is better than at any other point in the present workings of the mine, and carries a solid vein of smelting ore fifteen inches in width.

"For some time past, the ore in both veins has been gradually improving, and the stamp-ore the last week yielded seven and a half ounces per cord, and they run about three and a half cords per day. The last lot of smelting ore sold was also considerably richer than any previous lot.

"The mill and other machinery have recently been thoroughly overhauled and repaired, and now run as smooth and regular as any in the country. The stamps weigh 550 pounds each, have a drop of fourteen inches, and thirty-five strokes per minute. They also have twelve Bertola pans for working blanket-tailings, from which they get very good results. Mr. Wells has it in contemplation, also, to put in some concentrating apparatus to save more of the tailings.

"Through the politeness of Mr. Smails, the accountant for the company, we have been permitted to examine the monthly reports, which are made up in very convenient and accurate form, showing at a glance the number of tons of ore raised each month, its exact yield, the cost of mining, milling, etc. From these reports we gather the fact that, during the months of February, March, April, May, and June, 388 cords of ore were raised and milled by stamps, the average yield of which was six and a half ounces per cord, or a little more than one ounce per ton. It has only been about two months since they commenced saving smelting ore, and in the month of May they sold about $2000 worth, and now have a considerable quantity on hand. Their bullion shipments during the past five months foot up $54,545.34, out of which sum Mr. Wells has managed to pay all his current expenses, besides paying upward of $21,000 on old indebtedness of the company, and about $15,000 on improvements in the mine and mill. He has now got the old debts nearly wiped off, has the money in bank for the balance, and is rapidly getting both mill and mine in capital order for permanent and economical working."

THE CONSOLIDATED GREGORY COMPANY.

WE are informed that the ore in the Consolidated Gregory Company's mine has been steadily improving in quality for some time past, and that it now runs from five to six ounces per cord. This is a marked improvement from last winter, and is nearly or quite up to an average yield of the stamp-ore from the Gregory lode.

RUSSELL GULCH.

"MINING at this point," says the *Herald*, "is beginning to assume its wonted activity. Reed is making his Delaware property pay, Bradley is doing well with his new mill, and another mill is also doing a fair business. This is the beginning of a new era for this place."

CLEAR CREEK.

PROSPECTING on Chicago Creek continues brisk. Several good discoveries have recently been made. The Wilson steam stamp-mill, on Fall River, is running regularly and successfully, crushing two cords of ore every twenty-four hours. This mill has certainly a promising future.

AROUND GEORGETOWN.

FIVE hundred and eight ounces of silver were recently delivered from Stewart's reduction-works, the product of the Whale Mine.

The Georgetown *Miner* says: "The bullion report for the month of July, from this district, is quite small, as compared with previous months, and is attributable to two causes: L. Huepeden &

Co. only run ten days during the month, on account of want of ore, and the Brown Company were forced to shut down, owing to the destruction of their dry cord-wood by the disastrous fire that raged on the right-hand fork of Clear Creek a couple of weeks ago. Stewart shipped 7032.25 ounces, coin value $6554.15; L. Huepeden & Co., 3662 ounces, coin value $3295.60; and the Brown Company, 3120 ounces, coin value $4056: making a total of 13,814.25 ounces, coin value $13,905.75."

Nevada.

THE MINERS' STRIKE AT WHITE PINE.

THE differences between the mine-owners and miners at White Pine have not yet been adjusted, and the riotous disturbances previously noted still continue to afflict the community. A dispatch dated at Treasure City, August 4th, says:

"Several parties of the Miners' Union were out last night, and drove night-shifts out of the shafts where they were working for $4. They fired several shots down one shaft. One miner, who was being chased out of the shaft in darkness, fell into a cut, broke his thigh, and was otherwise bruised. Leonard, the President, and several other members of the Union, were arrested early this morning and sent to the County Jail at Hamilton. The books of the Union were captured, showing the names of the members. It is reported that the $4 men, who number 500, have formed a league to oppose the action of the Union. Some of the members of the old Virginia Union refused to join the Union here when applied to, on the ground that they were carrying the thing too far. Work in the mines is going on as usual this morning." Another dispatch, dated August 5th, has the annexed: "There are no demonstrations to-night by the Miners' Union. The lock-up and miners are strongly guarded, and a full force are working the mines. A number of the Miners' Unionists left the district yesterday. Nine of them were arrested yesterday and will be tried soon. A meeting of citizens is called to-night to devise means to protect the property of citizens and insure peace. There are rumors of threats to burn the city."

ANOTHER NEW DISTRICT.

A NEW mining district, called Mineral Hill, has been added to Lander County. The Austin *Reveille*, July 24th, says of it:

"Parties who have arrived here from Mineral Hill confirm the reports previously published in regard to the richness of the place. The old-rooted prejudice against limestone formations, however, still appears to influence the minds of a great many who shake their heads and express their want of confidence in the permanency of the mines, while others, and in our opinion the most sensible, express themselves satisfied with the sight of rich ore, no matter in what formation it may occur. That this exists in Mineral Hill in large quantities no one that has been there denies, and this, we take it, will be sufficient to insure the establishment of a permanent mining-camp there. The hill in which the mines occur is a small knoll detached from the main chain of mountains. The parties who discovered the place made their locations at leisure, no one being near to interfere. We are informed that the first company made forty-two different locations on what is supposed to be the same body of ore. Another company made ten in the same way, and this, we are informed, covers about all the ground worth locating on the hill. These gentlemen had the experience of White Pine in view, and were determined to avoid the expensive lawsuits to which the first locaters of that district have been subjected. Mineral Hill, therefore, will be a rather barren field for the legal fraternity. A town has been laid out, and the work of building has already commenced. Carlin, some thirty miles distant, is the nearest place to the mines, though for the present Austin will serve as the headquarters of the district. A road to the former place will no doubt be made, when the people there will be brought within easy reach of the railroad."

STILL ANOTHER NEW MINING DISTRICT.

THE name of Spring Valley has been given to another rich mining district that has just been added to Lander County. The *Reveille*, July 31st, says:

"It is situated a little south of east from Austin, and distant about sixty-five miles, and is only sixteen miles, in a southwesterly direction, from the Eureka District. It has been named the Spring Valley District by its discoverers, Messrs. Joseph F. Mayotte, William Murray, and George Kittelle, a party of prospectors from Austin. They discovered the place about the 25th of June last, made a number of locations, and organized the district, Mr. Mayotte being elected Recorder. Mr. Murray showed us certificates of assays from the mines located by the company, which were up in the hundreds, and informed us that several wagon-loads of ore were on their way here to be worked at the Manhattan mill, from which a large yield is expected. Mayor Frost, who has just returned from the district, corroborates Mr. Murray's statements in regard to the richness of the new mines, and has a high opinion of the district. The country rock resembles that of the Eureka District, and is limestone, but the ledges are said to be much stronger and better defined than those of the Eureka, or any of the other limestone districts heretofore discovered."

THE CONTRACT SYSTEM OF LABOR.

IT is said that the mine-owners at White Pine, in view of the strike, are letting contracts for all the work possible to be let in that way. They get more work for the money that way than any other, and the miners are better satisfied. Some of the best superintendents say that under contract they get as much work for $3.50 as is done by any miner on $5 wages.

THE MINERS' STRIKE IN HUMBOLDT—EVANS' NEW MILL, ETC.

A CORRESPONDENT, writing from Unionville, August 1st, says: "The miners' strike which occurred here some three weeks ago has about ended, and the mines are driving away as usual, mostly, however, with new sets of hands, working ten hours a day, as demanded by the compromises."

NEW MILL.

EVANS & Co.'s new mill has reached Mill City, and will be brought up and put in place as speedily as possible, under the direction of Mr. Jennings, formerly of Virginia City and Gold Hill. At present it will be started up, prepared to work only gold-rock, but in a short time a new battery and pans will be introduced for the working of silver ores. Mr. Jennings says he will have the mill running in about three weeks. Men are now at work on the foundation.

RICH DISCOVERY.

A FINE body of ore has been opened up in the mine of the Silver Mining Company, Humboldt District. It was struck at the extreme southern end of the works, where the lode is about five feet in thickness between casings, and nearly the whole consisting of a splendid quality of ore, much of which will yield at least $1000 per ton.

California.

ALPINE COUNTY—THE GLOBE MINE.

THE tunnel of the Globe Company is progressing favorably. According to the Monitor *Miner*, July 31st, "a large number of fine quartz-feeders have been recently cut, all showing ore to the eye, and all assaying flatteringly in precious metals. A new car and track of first-class construction has just been put in, and a new shop is being erected. A mill of 25-ton capacity will be shipped here next month to be put up at the mine. Mr. Winchester, the President, and largest stockholder of the Globe, is expected here in September. Giant powder is now used in this tunnel with good effect."

TITLE TO THE IDAHO MINE, GRASS VALLEY, NEVADA.

THE *Union* gives Commissioner Wilson's decision in regard to this claim. It is the first extension of the Eureka; and its application for a patent was objected to by the Schofield Company. "It is decided that a patent should issue to the Idaho Company for their claim of 3100 linear feet along the Eureka lode, as applied for."

MOORE'S FLAT DESTROYED.

ON the last day of July, the business part of this town was entirely destroyed by fire. The loss is about $75,000, half of which is covered by insurance. Most of the dwelling-houses escaped. The mines in the neighborhood are paying well, and enough of the business-houses to serve the purpose will be rebuilt.

THE CERRO GORDO FURNACES.

THE Los Angeles *News*, July 31st, says: "Five wagons arrived in this city on Wednesday afternoon, bringing 400 bars of lead and silver bullion from the Belshaw furnace, Cerro Gordo. Three new furnaces are near completion in that vicinity. Water is very scarce, and but little mining or smelting can be done until the springs rise or the rainy season sets in."

THE MARIPOSA MINES—GREAT NEED OF WATER.

FROM the Mariposa *Mail*, July 30th, we take the following items of mining news:

"A 10-stamp quartz-mill, situated four miles from Colorado, was completed last week, and has been crushing quartz from the Feliciana mine. A tunnel which taps the vein 400 feet below where the same was formerly worked, was finished a few months ago. There are 300 tons of good quartz now at the mill. The motive power is steam. The mine and mill are the property of Mr. Louis Trabucco.

"A letter from Hornitos says: 'The great prerequisite to the development of this rich mineral region is water; and if the Mariposa Company would study their own interests, they would lose no time in constructing a ditch from the South Fork of the Merced of sufficient capacity to supply the entire country. This great mining district is ninety miles long by twenty-five in width of placers, and embraces thousands of rich quartz-veins, to the development of which the waters of the Merced might be applied with ease. All the Mariposa Company need to do to make up for all their former back-sets, is to raise half a million of dollars, construct a ditch, lease their placer and quartz-veins, and we can prove to them by figures carefully calculated that the net income of said operations would not be less than $2000 per day.'"

Michigan.

THE COPPER MINES.

THE Houghton *Gazette*, August 5th, has these items of news:

"At the Hancock mine, orders have been received, and acted upon, to suspend productive operations, and discharge all force not required to continue a moderate amount of openings.

"It is rumored that, owing to the low price of copper, the Hecla dividend for August will be passed and the copper product held for a better price.

"The Copper Falls mine is said to be improving rapidly in the lower level, and since the connection of shaft and level, the work is prosecuted quite easy. Copper-cutters are again employed."

The annual report of the Calumet Company shows an excess of debits over credits of $108,505.03; the Hecla has an excess of credits of $132,739.52; the South Pewabic has an excess of debits of $182,767.10.

The following July products have been received:

Hecla mine, stamp,		240 tons.
Calumet mine, stamp,		190 tons.
Hancock mine, barrel and stamp,		25 tons, 1618 lb.
Isle Royale, June—mass and barrel,		23 tons, 1899 lb.
Stamps,	20 "	1528 "
Total,	43 "	3427 "
July—mass, barrel, and stamp,	24 "	820 "

The mill ran but fifteen days of ten hours each.

THE IRON MINES.

THE following are the shipments over the Marquette and Ontonagon road for the season up to July 31st:

Iron ore,	139,652 tons.
Pig-iron,	13,225 "

The shipments of iron ore from Escanaba, this season, up to date, amount to 164,000 gross tons. Basing an estimate on these figures, we may expect to see the shipments for the entire season foot up to 350,000 tons or upward. The rapid increase of the ore trade at this point speaks well for the future of the town.

A correspondent, writing from Negaunce, August 5th, says: "Deer Lake furnace is in blast again. The enlargement made in the stack last spring seems to have increased the capacity of the furnace much beyond expectation."

Montana.

MINING AT STERLING.

A CORRESPONDENT writes: "Mining matters are looking better in this district now than they have for the past eighteen months. The miners of Norwegian Gulch and Washington Bar are doing well. The Midas mill (Professor Ward's) will soon start up, with Mr. P. J. Jackson as its Superintendent. Mr. G. F. Cope has returned from the East, and assures me that he shall resume work with his mill. Reed & Norris will start the New-York mill next week. The Hobart mill, G. F. Appleton, Superintendent, is pounding away with good results. The Hall & Spaulding mill is pounding, night and day, for the past four months, on rock from the Mortier Hendricks lode, and has quartz enough out to keep it running for the next four months."

BULLION FROM HIGHLAND.

W. D. FLOWERS recently brought to Helena 140 ounces of bullion, the result of two weeks' run of his two arastras. The *Herald* says: "This is the third clean-up made by Mr. Flowers during the month of July, the aggregate result being $11,024 in currency—the entire working expense, we are assured, being but $969. The Only Chance rock yields uniformly $100 per ton, the gold assay being 932 fine, and the bullion selling at $26 an ounce in currency. This ledge, now becoming so celebrated, is developed by a tunnel 500 feet long, striking the ore 120 feet from the surface. From this level a shaft penetrates an additional 60 feet, making the lower level 180 feet from the surface. The pay-rock varies in width, branching out in places as high as 13 feet."

NEW QUARTZ-MILL.

A RECENT Helena *Herald*, says: "The Philadelphia Gold and Silver Mining Company have commenced crushing ore from the Paymaster lode. This lode is situated in the vicinity of Blue Cloud, and prospects very richly. Indeed, we understand that some $8000 was pounded out in one hand-mortar in less than three months. The character of the rock is lime, but until a clean-up shall have been made, no conjecture can be made as to its probable yield. The mill is a fine one, and now runs ten stamps; but the entire machinery being new, and leakages occurring, it can hardly be presumed that the first clean-up will be a fair test. The works are under the personal supervision of Mr. Cooper, one of the principal stockholders of the Company."

Idaho.

THE Idaho *World*, July 22d, makes the following report on the operations of the Idaho City Bed-Rock Shaft Company: "This new Company have secured title to bar and creek mining-ground, commencing at the confluence of Moore and Elk Creeks, and extending northerly along Bannock Bar and up Elk Creek some 1000 feet, and have secured use of steam-engine and boiler at the Lambing mill for hoisting and pumping purposes. The site selected for sinking a bed-rock shaft, ten feet in length by five in width, is just below the corral of H. Goff, on south side of Wallula-street. Operations for sinking shaft and removing engine and boiler to the site of the shaft commenced on Monday morning last. The work is to be done by subscription paper."

The same paper of July 29th has the following additional intelligence in connection with the above: "A double shaft has already been sunk and timbered to the depth of forty-five feet. Two gangs of four men each labor at it day and night, and yesterday was the ninth day. The hoisting apparatus will be attached this week, and next week, perhaps, the steam-engine pumping rig will be in operation to keep the shafts free of water."

PIONEER QUARTZ-MILL.

FROM the same source we also learn that Mr. James M. Classen has sold the splendid 25-stamp mill of the Pioneer mine on Granite Creek to the Gold Hill Mining Company. The new owners will start the mill on ores from their own mine in a few weeks.

"J. J. Tompkins and others have commenced to construct a ditch to bring water from Moore Creek, about ten miles above here, to a gulch near the Gambrinus mine, where very rich prospects have been struck for a long way down the gulch."

Utah.

THE SEVIER MINES.

THE following notes are from the Shermantown *Telegram* of July 26th: "These mines are situated within a few miles of Sevier River, about one hundred and eighty miles almost directly south of Salt Lake City. They have for some time attracted the attention of miners, although they have created no extraordinary excitement. Many of the ledges have been traced for miles by the croppings, and contain mostly silver, in connection with a little gold. The tests of their richness by mill process have been as yet limited. By assays the ore has shown a yield varying from $50 to $14,000 per ton. The mines are said to be easy of access, immense in size, with an abundant supply of wood and water. The population of the district is about 150—mostly Gentiles."

The White Pine *News* says that two miners have left Treasure City "for the rich placers and quartz gold diggings near the head of the Sevier River, Juab County, Utah. The placer diggings there have been known to exist and have been worked by the Mormons for more than a year, but not until recently was rich auriferous quartz found in the mountains some distance above the river and gulch-workings."

New-Mexico.

WE condense the following from the Moreno *Lantern*, July 17th:

"The gold shipments from Elizabethtown for the week ending on Saturday, July 17th, amounted to $7795, $3912 of which went to Denver.

"The Moreno Ditch is completed, and is supplying 100 inches of water to the miners in Humbug Gulch, giving employment to thirty men. The demand for water is greater than the company are able to supply.

"A two days' run on surface rock from the Candeleria lode gave a result of 57 ounces of gold.

"A quarter interest in the Atlantic lode has been sold to Denver parties for two thousand dollars. It has been opened in two places to a depth of forty and sixty feet, showing a vein of pay-rock two feet in width. The Incas lode, a new discovery, has been opened by stripping the crevice a distance of forty feet, and shows a crevice of pay rock two feet in width."

Arizona.

THE GOLD MINES.

WE take from the Prescott *Miner*, July 10th, the following mining items:

"The transfer of the Sterling Mine to the Sterling Mining Company will be consummated the 12th of this month. The sum to be paid is about $30,000 in gold.

"The news from the newly-discovered diggings near Walnut Grove continues to be good. Miners are said to be doing well.

"C. T. Rogers purchased recently from James A. Anderson, for the sum of $500, sixty-six and two thirds feet in the Independence mine, in Goodwin Mining District. Work is now being prosecuted at this mine with promise of great success."

The Roads of New-York Central Park.

BY WILLIAM H. GRANT, SUPERINTENDING ENGINEER.

AFTER what has been said in regard to the preliminary work of the Park roads, it will be seen that the mere surface material, that is generally looked upon as constituting the important feature of a road, forms but a part of the detail that is essential to good construction. The surface material forms, strictly, the superstructure of a road, and is, to a considerable extent, temporary; it wears away and needs to be renewed, while the foundation and other works that have been described are (or ought to be) permanent and lasting. Dr. Lardner gave it as his opinion, that the best engineering ability was required to make a good road; there is not much doubt, had he particularized, that he would have placed a large share of the ability on the side of foundation and preliminary work.

Three different kinds of superstructure, as has before been stated, have been resorted to in the construction of the Park roads—to wit: that of the *MacAdam road*, the *Telford road*, and the *gravel road*.

1st. THE MACADAM ROAD.—MacAdam's theory was, briefly, that small broken stones, when deposited on a road, and subjected to travel, together with heavy rolling, would arrange and adjust themselves together, by some mechanical law, in a compact, solid mass, their several sides and surfaces coming so perfectly in contact as to exclude all vacuities, and, in fact, to form practically a water-tight covering to the soil below. The layer of stones, so formed, was regarded in the double light of a protection to the soil upon which it was laid, and of a "flooring" to facilitate the passage of vehicles. Its objects were merely to accomplish these purposes. The thickness of the layer (according to the theory) was to be regulated, not with reference to its independent power of supporting the burdens brought upon it, but solely with reference to its usefulness as a film, supported by the underlying soil as its foundation, *to receive the wear of carriage-wheels and horses' feet.* The broken stones incorporated together in the manner supposed, were considered to form a coherent body, something like a layer of concrete.* The cementing property, as in the case of concrete, was not in reality claimed for it, but all the advantages derived from an actual cementation of the materials, seemed to have been expected, in some way, to result from the process.

Without discussing these points, it is sufficient to say, that they have been contested by some of the best French and English road-makers, and are not found to hold good in common practice. Clean broken stones, devoid of all foreign material (such as sand, gravel, or loam), as demanded by MacAdam, do not combine and solidify in the perfect manner assumed by his theory; they neither exclude water nor the action of frost from the material itself, or from the road-bed below, nor do they form so firm and coherent a covering to the soil as to prevent the unequal yielding and settlement and the occasional breaking up of the body of the material. In the less rigorous climate of England, where this kind of road originated, and where it has been very extensively used, more favorable results have doubtless been attained than are practicable in this country, except in its more southern latitudes; but, under the most favorable circumstances, it is not conceded that the principles upon which the method is based, have ever produced, or can produce, a road possessing the qualities and merits claimed by MacAdam. Nevertheless, with care, and some modifications of plan and materials, it is practicable to construct a very stable road in this climate, similar to, if not precisely in accordance with, MacAdam's ideal. Such a road is not believed to be the best or most economical for all purposes, and especially for a park or pleasure-grounds, but it may be adapted to other circumstances and localities where special reasons exist in its favor. The MacAdam roads of the Central Park have been constructed in the following manner:

Fig. 1.

The preparation of the road-bed, and all the preliminary work, drainage, etc., that have been previously described, it will be understood, apply equally to the MacAdam road and to the other kinds of road that were successively constructed (the descriptions of which will follow in their order). The process of construction, here described, commences, therefore, with the superstructure of the road—that is, with the road material, or broken stone—after the surface of the ground or road-bed had been prepared for its reception.

1st. *The broken stone, or "road metal."*—This was obtained, at first, entirely from the hard trap or basaltic boulders that were found profusely scattered over the Park grounds. The largest boulders were split into two or more parts by drilling and blasting, and these, together with the smaller sized boulders, were "sledged up" by hand, by the use of heavy hammers or sledges, the product being usually angular, wedge-shaped pieces of stone, of six to twelve inches in their largest dimensions. These pieces were next broken up by the use of small stone hammers, weighing from one and a quarter to one and a half pounds each (Fig. 1), into the sizes required for use on the road. The rule as to size was that commonly adopted—the stones to pass through a two and a half inch ring in their largest direction. The boulder-stones were peculiarly hard and tough, and difficult to break, especially in the sledging operation, without considerable practice and adroitness on the part of the men employed. Ordinary granite, gneiss, or limestone, breaks much more easily, but from this fact these kinds of stone are less serviceable for wear. The tenacious quality of the basaltic boulders gives them great superiority over other kinds of stone, and this consideration, together with the advantage afforded of obtaining them near the site of the roads, rendered their selection for the intended purpose a question that admitted of no doubt.

A large quantity of broken stone of this description was prepared in advance of the other portions of the road-work, several hundred men having been employed by the Park Commissioners for the purpose, previous to the commencement of the actual construction of the Park. After the roads had been commenced, it appearing that the boulder-stone would not suffice for the completion of the roads, in case the MacAdam method was adopted throughout (or even if the Telford method were in part substituted), men were set to work breaking up stone from the gneiss rock of the Park that was blasted out in making the road excavations. This latter stone, being inferior to the boulder-stone, was made use of by depositing it on the roads in the bottom portion of the layer, making about one half of the full depth, and the balance was completed with the harder and superior boulder-stone. In placing the stones upon the road, care was taken to obtain them as clean and free from the finer or crushed particles as possible. Broad forks, or "pronged shovels" (shown in Fig. 2), made for the purpose, were used in transferring the stone from the piles where they were broken to the carts that hauled them to the work; by this means the dirt and finer material were sifted out.

2d. *Manipulation of materials, rolling, etc.*—The full depth of the layer of broken stone, gneiss and boulder, was twelve to thirteen inches, and was made up in successive layers of three to four inches thick. Each layer was evenly spread and rolled, and, as far as practicable, and time would permit, the benefit was obtained, during the different stages of the work, of the travel of the working teams, wagons, and carts of the Park over the stone, to aid in its consolidation. The rollers employed previous to depositing the last or surface layer of stone, were the same that were used in rolling the road-bed, and were drawn by two horses. These rollers were six feet long, composed of six cast-iron cylinders, thirty-six inches in diameter, and weighed altogether about one and three quarter tons. Heavier rollers would have been liable to press the broken stones into the road-bed and disturb the foundation, especially if the rolling had been carried on after a rain that had softened the earth. Rolling was avoided, or was done with great care, when the materials or road-bed were too wet; when the stones were dry, water was applied by sprinkling All inequalities of the surface of the several layers, caused by the travel of teams or by the process of rolling, were adjusted as they occurred, and the crowning form of the road was accurately preserved throughout, by men who were employed with the necessary implements (chiefly iron rakes and pronged shovels), and instructed for the purpose.

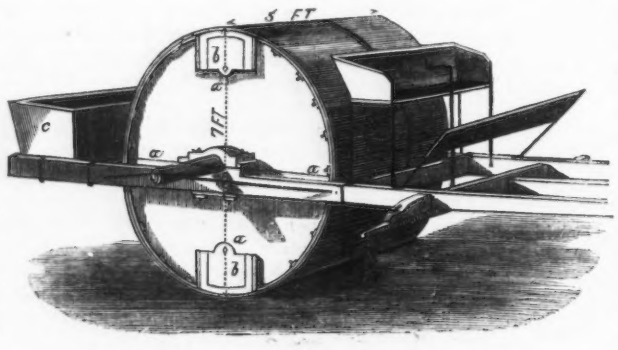


Fig 3.

After depositing the last layer of hard stone, a heavier roller was used. This roller was constructed specially for the purpose, and is represented by Fig. 3. Its weight was six and a half tons, and it was adapted to being loaded additionally, as required, to nine and twelve tons. It was composed of two hollow cylinders of cast-iron, set abreast on a strong wrought-iron axle, making together a length of five feet, with a diameter of seven feet; the cylinders were set in a timber frame-work, that was so arranged as to admit of being suitably balanced on the journals, and the whole was drawn by eight horses. Apertures were made in the ends of the cylinders, through which the interior cavities, consisting of four separate cells in each cylinder, could be filled with broken stone and gravel, and the weight thereby increased up to twelve tons, as above stated. Two of these large rollers were constructed at the commencement of the work, and have served, with but few repairs, for the entire road-system of the Park. They have performed, literally, a heavy duty, and it may be said to their credit that the service they have rendered as road-makers has not been surpassed by that of any other *inanimate matter* that has been employed. It may be added, that some study was given to the general plan and arrangement of these rollers, and it has not been discovered, during the period they have been in use, that any material modification of the design could be made to advantage. As will be seen hereafter in the description of other kinds of road, they are adapted to the Telford and the gravel roads without additional loading, and when loaded, partially, or to their full capacity, they are adapted to the greatest requirement of MacAdam roads.

At the commencement of the MacAdam roads, the experiment was tried of rolling and compacting the stone by a strict adherence to MacAdam's theory—that of carefully excluding all dirt and foreign material from the stones, and trusting to the action of the roller and the travel of teams to accomplish the work of consolidation. The bottom layer of stone was sufficiently compacted in this way to form and retain, under the action of the rollers (after the compression had reached about its practical limit), an even and regular surface, but the top layer—with the use of the heavy roller loaded to its greatest capacity—it was found impracticable to solidify and reduce to such a surface as would prevent the stones from loosening and being displaced by the action of wagon-wheels and horses' feet. No amount of rolling was sufficient to produce a thorough binding effect upon the stones, or to cause such a mechanical union and adjustment of their sides and angles together, as to enable them mutually to assist each other in resisting displacement. The rolling was persisted in, with the roller adjusted to different weights up to its maximum load, until it was apparent that the opposite effect from that intended was being produced. The stones became rounded by the excessive attrition they were subjected to, their more angular parts wearing away, and the weaker and smaller ones being crushed. The experiment was not pushed beyond this point. It was conclusively shown that broken stones of the ordinary sizes, and of the very best quality for wear and durability, with the greatest care and attention to all the necessary conditions of rolling and compression, would not consolidate in the effectual manner required for the surface of a road, *while entirely isolated from and independent of other substances.* The utmost efforts to compress and solidify them while in this condition, after a certain limit had been reached, were unavailing.

Fig. 2.

[To be continued.]

* Concrete is formed of broken stones, or gravel, cemented together by means of an intermixture with hydraulic cement and sand, forming, when the process of induration is complete, an artificial stone, similar to conglomerate or pudding stone, and not inferior to ordinary natural stones.

Brooklyn Improvements.

THE Eastern District of Brooklyn has within the last two years made the most remarkable advancement in wealth and importance, and its churches and public buildings are of a very costly description. Its streets are being widened, well lighted, and paved with the different improved pavements. Among the churches now in course of erection are the First Reformed Church (the Rev. E. S. Porter's) on Bedford avenue, and the Church of St. Vincent de Paul (R. C.), the Rev. D. O'Mullane, pastor, on North Sixth-street. Both are very handsome structures. Additions and improvements have also been made to the Ainslee-street Baptist Church, and the Sunday-school and lecture-room of the New-England Congregational Church (the Rev. Leonard W. Bacon's), on South Ninth-street. A new armory is being erected in the Sixteenth Ward, fronting on the Bushwick Boulevard and Stagg-street, the rectangle formed by which is 125 × 100 feet. The dimensions of the drill-rooms (of which there are two) are 97 × 66 feet each. Adjoining the lower drill-room will be an artillery-room, 25 × 75 feet, for the storage of ordnance. It is expected to have the buildings finished by the 1st of December. Very extensive buildings are being put up for the People's Gas Company, fronting on the East River, between South Tenth and South Eleventh streets. The retort-house is 182 × 51 feet, and the purifying house is 114 × 40 feet, with a meter-house on the east and west extremes. The tank is to be 97 feet in diameter and 26 feet deep. A new addition, 75 × 60 feet, at a cost of $40,000, is being made to the Boulevard Brewery (Frederick Fries, proprietor), and is calculated to store 10,000 barrels of beer. Excavations are being made for the foundations of a new edifice for the Williamsburg Savings Bank, on the corner of Broadway and Fifth-street, which promises to eclipse all others in the district for beauty. Ground has also been broken for a public market on land between the East River, First-street, South Sixth-street, and Broadway, which will be of vast importance to the citizens of the district, and prove a ready market for the produce of the island, conveyed almost to its doors by the Southside Railroad. A building 54 × 57 feet, with a wing 12 × 15 feet, is also going up for Primary Public School No. 4, on Union-avenue and Devoe-street. In the Fifteenth, Eighteenth, and Nineteenth Wards a large number of private residences of good style are in course of erection, and all over the district great efforts are being made to attract within its limits wealth and fashion.—*New-York Tribune.*

A SCHOOL of Mines, free to all who pass the necessary examination, has been established at Saint-Etienne, and engineers have been nominated in each department of France to examine applicants.

BESSEMER ROYALTIES.—The statement that they have been or will this year be reduced, on products for either home or foreign consumption, has been officially denied by Mr. Bessemer.

THE ENGINEERING
AND
MINING JOURNAL.

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The Preparation and Duties of a Steamboat-Engineer.

WHEN we take into consideration how often hundreds of lives depend on the efficiency of the steamboat-engineer, it must be seen at once that it is one of the most responsible of all vocations. A large amount of information and experience, and a conscientious desire for the full discharge of his duties, should be required of him. Since there are so many incompetent engineers employed, it may be well to take a view of what should be required in the way of previous preparation and duties. A steamboat-engineer should, by means of an early school education, have been trained so as to be able to keep accounts, and make notes of all that occurs in the engine-room—the performance of his engine, for instance, in regard to consumption of coal, the number of revolutions, velocity of boat, log, etc. He should have acquired knowledge of the first principles of mechanics, and a general knowledge of the basis of hydrostatics, hydraulics, and pneumatics, without which it is utterly impossible to understand clearly many of the principles on which the engine works, and on which its power depends. There is likewise necessary some knowledge of the theory of combustion, ebullition, and evaporation; also an acquaintance with the subject of steam, its temperature, pressure, latent heat, etc., and, if possible, of the modern theory of the conversion of a certain number of heat-units into power. Then, again, he should have acquired knowledge enough of mechanical drawing to enable him, in the event of the engine being broken when at a distance from a machine shop, to make a working drawing, so that it might be replaced. But, above all, he should, after leaving school, be trained as a practical mechanic, and be a fair workman in iron, brass, and wood—able to work not only at the lathe and vice, but also at the blacksmith-forge. It is evident that we speak here, not of engineers of steamboats plying for a short distance on rivers, which, like ferry-boats, are always within the reach of assistance, and at any time may be towed to a machine-shop, but of boats which travel on the ocean, the American lakes, or elsewhere, beyond the reach of immediate assistance.

In regard to his duties, besides, of course, starting, regulating, and stopping the engine as promptly as may be required, his chief duty is to keep all moving parts well lubricated, and to see to it that, by means of the vibration, none of the bolts, pins, or keys work loose, shift their position, or come out of their places. He should also beware that none of the working parts become overheated by any undue amount of friction, arising from excessive tightness, want of lubrication, or other cause. If they become overheated, he must take prompt and energetic measures to correct the evil, and prevent the serious consequences that might arise therefrom. He must, from time to time, carefully observe the effect produced by the gradual wear of the working parts, so that, as soon as their accuracy is materially affected, he may take steps to rectify the matter at the first opportunity. He must also be careful to observe whether any part of the frame at any time begins to get loose or in any way work, and, should such be the case, try to discover the cause, in order to remedy the defect as soon as the engines are at rest. Another important duty is to take good care of his engine, seeing to it that no grit or dirt gets into the bearings or moving parts. He should wipe away the oil most carefully and completely as soon as it has passed through the bearings, and never allow it to run down, or remain upon the engine. And again, he must be watchful that no steam escape through valves or joints that should be steam-tight, and that no air enter any part of the engine where a vacuum is necessary.

But, above all, it is the boiler which requires his unremitting and particular attention, so that always the proper amount of steam, neither too little nor too much, is generated for the engine. To ensure this, he must be able to instruct his firemen as to the proper management of the fires, as very few of them understand this properly. He must see to it that the supply of coal in proper quantity is kept up at proper intervals, that the fires are periodically cleared of clinkers, ashes, and other earthy matter, and that the draught is so regulated that the consumption of fuel may be made proportionate to the consumption of steam. The constant supply of water to the boiler in quantity just sufficient to compensate for the continual consumption of steam, must, of course, be assiduously attended to.

Another and important duty of a steamboat-engineer is this: If he is upon salt water, or in the muddy water of the Missouri and Mississippi rivers, and has no surface condensers, the boilers may become saturated with salt or charged with mud, through the continual evaporation going on. He must look to it that this saturation does not go on to such an extent as finally to cause a deposition of salt and other substances contained in the water. After the boilers have been in use for some hours, so that the water has become briny or very muddy, he should, in case the engine is not fitted with an apparatus for the continuous discharge of the salt or mud, blow it off from time to time by means of the common cocks intended for that purpose. On the ocean he should, in any event, test the concentration of the brine in his boilers every three or four hours, either by means of the hydrometer, which indicates the specific gravity, or, better, by means of the thermometer, which indicates the temperature at which it boils. The brine is considered to be of the proper strength when it boils at a temperature 2° higher than the sea-water under the same conditions.

It is also occasionally very advantageous for the engineer to take indicator diagrams, in order to satisfy himself that the action of the valves continue to be as required. This is, of course, very useful before coming into port, since, by the subsequent stoppage of the engines, a good opportunity offers itself for correcting incipient defects.

Immediately upon the consummation of a long voyage, the engineer should test the tightness of the steam valves and pistons, by putting them in a position that enables him to see if they are steam-tight. If this is not the case, he should raise the cylinder-covers, draw out the valves, etc., get at the pistons, and rectify the defects as much as possible. He should by no means consider that his labor ends with the voyage, but should examine all the interior parts of the engine, repairing what he can; and, above all, try to remove incipient defects. He must rectify all defects in regard to motion, tighten the fastenings of the frame, examine parts subject to corrosion, clean, dry, paint, etc., if necessary. The water should be completely removed from the boilers, all the ashes and soot taken from the furnaces and flues as completely and as soon as possible. The furnaces, flues, and boiler should be thoroughly examined; and, in regard to the latter, special attention should be given to the immediate repair of any defects that may be found. Especial attention should be given to leaks in the top of the boiler, as nothing tends more to corrode and destroy it. The scales should be removed, and the roof of the boiler scraped, cleaned, dried, and covered with a few coats of preservative paint.

The same process must be applied to the whole of the iron-work, paddle-wheels; and all broken floats or hook-bolts should be replaced by new ones. The wheels should be turned round every three or four days, so as to change the parts exposed to the water, and thus to prevent corrosion. In the case of a propeller or screw-steamer, the whole of the bearings of the shaft should be examined, and, if necessary, taken apart, so as to have them in perfect order for the next voyage; for which the engineer must take care to have his supply and stores on hand as early as possible—procrastination, in this respect, having been the cause of many a misfortune.

Many will perhaps think that most of the above suggestions are matters of course, and are always attended to, but a long experience has taught us that this is by no means the case. Owners of steamboats should always see that their engineers have fulfilled the above requisites. If the desire to prevent accident and sometimes dreadful loss of life, cannot move them to this, at least their own pecuniary interest, which for many is a stronger stimulus to proper action than any other consideration, may incite them to vigilance. Even while writing this, we hear of the failure of the boiler of the steamer *William Taber*, which, two weeks ago, went from New-York on an expedition to Texas, for the purpose of bringing back fresh beef, to be preserved during the passage by means of cold, produced by an artificial freezing-machine. It is a pity that the financial success of this enterprise should have been thus endangered either by parsimony on the one side, or carelessness or ignorance on the other. But so long as engineers can be found who are willing to take charge of any kind of engine, however bad it may be, there is not much hope for improvement in this respect.

In the mean time, it is certain that if the hints here given concerning the preparation and duties of steamboat-engineers were always carefully followed out, the number of steamboat accidents would be reduced to at least one quarter of the present number.

Aerial Navigation.

FOR several weeks the daily papers have contained reports from San Francisco, about a new flying-machine called the "*Aviator*," built by the Aërial Navigation Company. It is believed by some that the great problem of navigating the air will be solved by this machine. It is said that it will start for New-York in a short time; but whether it will ever arrive here is quite another question.

Every observing mind is satisfied that the force of the wind is such that even with a moderate breeze such an affair must move in the direction that the wind blows, and that for two reasons: Firstly, from the fact that the size of the balloon necessary to support the weight of the machine and passengers is such that it offers an amount of surface on which the wind exerts a pressure nigh to irresistible for any amount of power that can be carried along with it. This size may be roughly estimated at one cubic yard for every pound of weight supported. Secondly, on the ground that such a balloon, or flying-machine, has not the advantage possessed by a sailing-vessel of a heavy medium, as, for instance, water underneath it, the resistance of which can be used to change the direction in which the wind would otherwise carry it. The balloon must therefore go the way the wind blows. The necessarily small amount of power on board would have but a very small effect indeed, as compared with that of a strong breeze striking upon the surface of the balloon. Since a brisk wind travels with a velocity of from 20 to 30 miles per hour, the machine must be able to move with this velocity in a dead calm, in order to hold its own in case it should encounter such a wind—to say nothing of making headway against it. If, therefore, such should be the maximum power, then it would have to descend to the ground at every strong contrary wind, and could travel only under favorable circumstances. For this reason, the plan of crossing the continent is more safe than the insane idea of crossing the Atlantic Ocean, about which so much was said several years ago. There is one fact in favor of the eastward balloon voyage—namely: that in our latitude, at a certain height, an eastward current is always encountered, but in its general direction it deviates to such a degree that it is not certain whether a machine from San Francisco would arrive in Nova Scotia or in Florida—provided, of course, that the power on board were not sufficient to bring about any material direction from the general course of the wind during the two or three days necessary for the trip. The probability is, that the single act alone of keeping the machine in the desired direction, against oblique but, notwithstanding, favorable winds, would require more power than can possibly be kept aboard of an apparatus which has no other support than the air in which it floats.

It is, at the same time, evident that, having once arrived at the East, the machine could never fly back again. The only alternative would be to circumnavigate the globe. This would take about 25 days. The two really dangerous sections are the Atlantic and Pacific Oceans, for the simple reason that, in case of occasional storms and hurricanes, with a velocity of 80 and 100 miles per hour, the machine could not descend as on *terra firma*. Those storms and cyclones sometimes extend upward and disturb the regular west wind in which the machine is expected to sail. It is true the air is more rarified there, and offers less pressure on resisting surfaces, but then the wings, propelling screws, or other contrivances, have also a less resistant medium to act upon, and, consequently, exert an effect that is diminished in the same proportion. It is not a little curious that the old joke of circumnavigating the earth from east to west, in 25 hours, by jumping on the disk of the moon, is reversed here, and that we are earnestly discussing the possibility of circumnavigating the earth from west to east in 25 days, by sitting on the wings of the wind.

The New Post-Office Building.

THE Government architect, Mr. Mullett, has broken ground in the City Hall Park, on the site originally purchased by the Government of the city authorities. At one time it was thought that a more advantageous site might be obtained, and Messrs. A. T. Stewart, Horace Greeley, and William Orton were commissioned to negotiate for an exchange. But through unwillingness on the part of the city functionaries, and after various tedious delays, the negotiation fell through. The foundations will be laid at once, though the drawings of the proposed structure are only just begun. Much is anticipated from the accomplished Treasury architect, who is commissioned to design the new edifice.

Terrible Accident in a Coal-Mine.

BUT a week ago, we noted the fact of a fearful disaster in the coal-mines near the city of Dresden, Saxony. An exchange tells us of a home accident, which, though not marked on account of great loss of life, is nevertheless peculiar as regards its nature. It was the falling of an iron cage, full of miners, forty feet, to the bottom of the shaft. If no lives were lost, what would have been the result had the distance been *four hundred feet*?

MARKET REVIEW.

The Coal Trade.

NEW-YORK, August 20th, 1869.

THE coal trade during the past week has been entirely free from the speculative spirit which has been its marked feature for the past three months, and seems to be settling down to the even tenor of its way once more. As we announced in our last week's issue as being most probable, the men in the Lehigh refused to accept the new basis of the operators, and suspended work. The engineers joined in the movement, and the operators were compelled to supply their places to keep the mines from filling up with water. If this action on the part of the operators in the Lehigh was general, it might be expected to prove effective in altering the terms of the basis, which are very unfair and oppressive as compared with the basis under which the Schuylkill operators are at work—the one being based upon $3 at Port Carbon, while the Lehigh is predicated upon $5 at Elizabethport, thus compelling the latter to assume and pay the men upon all advances in transportation, which have been very excessive during the past forty days (at present $3.10 to Elizabethport); but several of the large companies, embracing the old Lehigh, Honeybrook, Coleraine, Buck Mountain, and Ashburton, continue at work on the old basis, so that the strike of the operators is not likely to prove very effective. The low water in the Schuylkill Canal has suspended navigation completely by that channel, and many collieries in the Schuylkill are compelled to stop for want of an outlet to market. The news from the Lackawanna is that the companies and the men have commenced to negotiate; and while the men seem determined still "to demand the basis" which the companies will never yield, we do not consider it improbable that on or before September 1st they will resume work at the same wages paid by the Pennsylvania Coal Company.

What will be the immediate future of prices in the event of an early resumption by the Lackawanna companies is a question that is being considered in coal circles. The production will not be measurably increased, as many of the Scranton men have been employed in the other regions during the long strike, and have contributed to the increased production that has taken place in the Lehigh and Schuylkill. But we anticipate that its effect will be to steady the market and prevent any further enhancement in prices, and possibly some decline from current quotations. Vessels are very abundant, and orders quite scarce at present at the several shipping-points.

The following is the circular issued by the Lehigh Board of Operators, of which mention is made above, and to which we referred last week:

"*Whereas*, The result of the last month's working under the Basis and Regulations of the Miners' Union has demonstrated to us that we can no longer carry on our works and do justice to the public or ourselves on this basis; therefore, be it

"*Resolved*, 1. That the price of coal at Mauch Chunk, as fixed by the Operators' monthly meetings in Philadelphia, shall be the basis upon which the rates of wages shall be calculated.

"2. That the basis be fixed at the average price of lump, broken, egg, stove, and chestnut at Mauch Chunk in April last (which average was $3.50 per ton), and the wages, car price, and yardage on that basis, and 10 per cent above April wages—advancing or receding as coal advances or recedes in price; and ten cents per ton to the miners for each dollar of advance or fall on price at Mauch Chunk, and 12½ per cent on the basis price of wages to inside and outside laborers—except for engineers, mechanics, and others regularly employed, who shall have April wages as a basis, and an advance of $1 per week for each dollar of advance in coal, and a proportionate reduction on the decline of coal, and that no change in wages shall be made unless the rise or fall in price shall be 25 cents per ton, and that the wages fixed at or about the first of each month, by the meeting of Lehigh Operators for coal sold at Mauch Chunk during the month, shall be the rate of wages to be paid for that month, whether coal rises or falls during that month.

"3. That, in the estimate of tonnage of cars, forty-eight (48) cubic feet shall be allowed as one ton, that being the average number of feet for a ton, as shown by the result of last year's work.

"4. That we will not employ men from other collieries, or from other regions, who are on a strike.

"5. That we allow no interference with our business, either by restricting the amount of coal to be produced, or in the employment or discharge of men, and that all rules and regulations in force at the different collieries for their government in April last shall continue to be observed.

"6. That the wages, fixed as above, shall be announced to the men on Friday, August 13th, to take effect on Monday, August 16th.

"BY ORDER OF THE BOARD."

Our Philadelphia correspondent, under date August 19th, writes: "The coal market is a little firmer, with indications that prices will advance. Freights remain unchanged. Vessels are plenty."

The following table exhibits the quantity of Coal passing over the following routes of transportation for the week ending August 14, 1869:

COMPANIES.	1868. WEEK.	1868. TOTAL.	1869. WEEK.	1869. TOTAL.
Phila. & Read. R. R.	18,108	1,714,045	104,940	2,397,303
Schuylkill Canal, ..	1,301	483,676	32,624	417,961
Lehigh Valley R. R.	45,178	1,441,357	66,004	1,385,212
Lehigh & Sus. R. R.	14,728	243,226	24,563	493,165
Lehigh Canal, ...	34,225	444,002	37,435	381,181
Scranton North, ...	22,693	646,550		587,631
" South, ...	14,018	311,387		205,857
Penn. Coal Co., rail.	21,871	547,173	22,209	884,837
" " " canal.	830	16,054	836	10,595
Del. & Hudson Rail.			1,224	102,769
" " " canal, N.	51,375	867,309	15,285	647,085
" " " " S.				51,174
Shamokin, ...	11,140	291,559	15,454	229,491
Trevorton, ...		11,869		11,091
Short Mountain, ...	3,207	59,632	2,845	62,564
Lykens Val., Can.Co.	1,796	52,216	1,988	41,662
Hunt'g'n & B'd Top,	6,032	146,312	6,429	217,478
Wyoming South, ...	10,441	118,549	12,323	145,848
" North. ...	5,693	21,209	2,868	7,666
Williamstown, Col'y	5,527	105,343	6,606	116,637
Total, ...	268,163	7,521,468	353,633	8,097,207
1869, ...			268,163	
Increase week, ...			85,470	

Lehigh Canal Coal Trade.

Shipped for the week ending August 14, 1869.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total M. Chunk Region, ...	11,681 16	106,506 16
" B. Meadow "	6,253 18	60,086 09
" Mahanoy "	281 00	1,907 01
" Hazleton "	11,226 03	102,876 17
" Upper Lehigh "	592 12	4,635 03
" Wyoming "	7,399 14	105,168 15
Grand Total, ...	37,435 03	381,181 01
Corresponding week last year,	34,225 10	444,002 07
Increase, ...	3,209 13	
Decrease, ...		62,821 06

Report of Coal Transported over Lehigh Valley Railroad

For the week ending August 14, 1869, and previously this season, compared with the same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREVIOUSLY Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy, ...	14,018 14	229,164 18	243,183 12
" B. Meadow, ..	12,691 00	238,164 15	250,855 15
" M. Chunk, ..		150 10	150 10
" U. Lehigh, ..	186 08	8,288 14	8,475 02
" Hazelton, ...	28,580 06	633,027 04	661,617 10
" Wyoming, ..	11,359 05	249,985 14	261,344 19
Total, ...	66,845 13	1,358,781 15	1,425,627 08
To L. & S. R. R., at P'n Hav. for rail,		4,174 00	4,174 00
Do. for canal, ...	11,127 07	95,453 18	106,581 05
At Mauch Chunk for Canal, ...	6,534 18	57,170 03	63,705 01
Total Anthracite, ..	84,507 18	1,515,579 16	1,600,087 14
Susquehanna Region Bit. Coal (Fall Creek).....		552 03	552 03
Rl. by rail & canal,	84,507 18	1,516,131 19	1,600,639 17
Same time last y'r,	61,768 11	1,509,389 16	1,571,158 07
Increase, ...	22,739 07	6,742 03	29,481 10
Decrease, ...			
Forw'd east from M. C'k by rail, ..	66,004 16	1,319,207 16	1,385,212 12
Same time last y'r,	45,178 18	1,396,178 19	1,441,357 17
Increase, ...	20,825 18		
Decrease, ...		76,971 03	56,145 05

RECAPITULATION:

Forw'd east from M. C'k by rail, ..	66,004 16	1,319,207 16	1,385,212 12
Del. at M. Chunk, ..	11 08	654 09	665 17
Del. on line of r'd above M. Chunk,	37 04	5,561 04	5,598 08
Del. ab. M. C. for use of L. V. R. R.,	649 07	28,348 00	28,997 07
To N. C. R. R., at Mt. Carmel, ...		2,516 09	2,516 09
To L. & S. R. R., at P'n Hav., for r'l.		4,174 00	4,174 00
Do. for canal, ...	11,127 07	95,453 18	106,581 05
Do. Packerton for rail, ...	142 18	3,046 00	3,188 18
At Mauch Chunk for canal, ...	6,534 18	57,170 03	63,705 01
Total, ...	84,507 18	1,516,131 19	1,600,639 17

Lehigh and Susquehanna Railroad.

Report of Coal shipped South for the week ending August 14, 1869.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total M. Chunk Region, ...	4,539 16	92,539 07
" Hazelton "	11,191 16	104,488 16
" Upper Lehigh "	2,957 01	76,070 17
" Wyoming "	24,833 12	429,492 16
Grand Total, ...	43,522 05	702,591 16
Corresponding week last year, ..	30,387 13	477,748 15
Increase, ...	13,134 12	224,843 01
Decrease, ...		
Forwarded South from Mauch Chunk, ...	23,271 02	453,885 12
Delivered on line of L. & S. R. R., above Mauch Chunk, ...	287 18	19,435 06
Delivered to Lack. & Bloom. R. R., at Plymouth Bridge, ...	1,005 00	14,693 06
Delivered to L. V. R. R. Co., at Sugar Notch, ...		5,151 03
Delivered at Coal Port, for Shipment by Canal, ...	18,958 05	209,426 09
Total, ...	43,522 05	702,591 16

Schuylkill Coal Trade.

Report of coal transported over the Schuylkill Canal for the week ending Thursday, August 12, 1869.

	Tons. Cwt.
From Port Carbon, ...	9,619 00
" Pottsville, ...	1,711 00
" Schuylkill Haven, ...	20,081 10
" Port Clinton, ...	1,213 00
Total for week, ...	32,624 10
Previously this year, ...	385,336 14
Total, ...	417,961 04
To same time last year, ...	483,676 14

Report of coal transported over the Philadelphia and Reading Railroad during the week ending Thursday, August 12, 1869.

	Tons. Cwt.
From St. Clair, ...	39,609 16
" Port Carbon, ...	10,165 08
" Pottsville, ...	3,271 10
" Schuylkill Haven, ...	28,574 00
" Auburn, ...	3,860 14
" Port Clinton, ...	14,298 11
" E. P. R. R.	211 04
" Harrisburg and Dauphin, ...	12,751 14
Total paying freight, ...	112,742 17
Coal for Company's use, ...	5,163 14
Total for week, ...	117,906 11
Previously this year, ...	2,308,502 18
Total, ...	2,426,409 08
To same time last year, ...	1,972,590 08

Cumberland Coal Trade.

B. & O. RAILROAD.

The shipments over the Baltimore and Ohio Railroad for the week ending August 14th, 1869, were as follows:

From Cumberland and Pennsylvania R. R.

	Tons.
Consolidation Co., ...	2,774.14
Borden Co., ...	1,494.02
Balt. & Hampshire Co., ...	972.00
Midlothian Co., ...	1,326.02
Cooke, ...	358.12

Cumberland Coal Trade.—Continued.

From Eckhart R. R.

C. C. and I. Co., ...	2,893,19

From George's Creek via Piedmont.

George's C. C. & I. Company, ...	647.00
Central "	3,847.13
Atlantic "	1,870.08
Piedmont "	2,305.17
Swanton "	1,894.04
American "	2,379.16
Barton "	1,898.10
Potomac "	920.06
Franklin "	1,575.04
Hampshire "	2,480.12
Total, ...	19,819.10

BY C. & O. CANAL.

For the week ending August 14th, 1869, the shipments by the Chesapeake and Ohio Canal were as follow:

	Tons.
American Co., ...	3,954.12
Borden Co., ...	2,944.07
Central Co., ...	3,678.17
Consolidation Co., ...	3,171.03
C. C. & I. Co., ...	2,034.18
Hamp. and Balt. Co., ...	1,194.12
Midlothian Co., ...	865.02
George's Creek Co., ...	979.03
Maryland, ...	109.05
For private parties, ...	1,276.10
Total for week, ...	20,208.08

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW-YORK, Aug. 19th. R. A.	W. A.	AT PHILADELPHIA, Aug. 19th. R. A.	W. A.
SCHUYLKILL.				
Lump, ...	$....	$8 25	..	7 50
Steamer, ...	....	8 25	....	7 50
Broken, ...	....	8 25	7 25	7 50
Egg, ...	....	8 25	7 25	7 50
Stove, ...	....	8 50	7 25	7 50
Chestnut, ...	....	7 50	6 50	6 50
Pea, ...	....	....	....	....
LEHIGH.				
Lump, ...	8 50	....	7 75	....
Steamer, ...	8 35	....	7 75	....
Broken, ...	8 35	....	7 75	....
Egg, ...	8 35	....	7 75	....
Stove, ...	8 50	....	8 00	....
Chestnut, ...	8 00	....	7 00	....
Pea, ...	....	....	5 25	....
SPECIAL COALS.*				
Diamond Vein, ...	R. A.	8 75	....	....
New-England, ...	....	....	....	....
Locust Dale, ...	W. A.	8 50	....	....
Honey Brook, Le'h	" "	8 35	....	....
Harleigh,	" "	8 35	....	....
Spring Mount'n	" "	8 35	....	....
Sugar Creek, ...	" "	8 35	....	....
Sugar Loaf, ...	" "	8 35	....	....
Fulton, ...	" "	8 35	....	....
Stout, ...	" "	8 35	....	....
Old Comp'y's ..	" "	8 35	....	....
Cross Creek, ...	" "	8 35	....	....
Chauncey, ...	" "	....	....	....
Girardville, ...	" "	....	....	....
McMichael, ...	" "	....	....	....
Duncan, ...	" "	....	8 00	....
Shamokin, ...	" "	8 25	7 50	....
Lykens Valley, ..	" "	....	8 00	....
Broad Top, ...	" "	....	5 25	....
Hill & Harris, ..	" "	....	7 25	....
Henry Clay, ...	" "	....	7 25	....
Powelton, ...	" "	....	7 25	....
Burnside, ...	" R. A.	....	8 00	....

[* Dealers in these coals may be found in our advertising columns.]

Kittaning Coal Co.'s Phœnix Vein, .f. o. b.	$5 50
Lemon " .. "	5 25

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Scranton at E. Port,	...	...	...	...	...	...
Pittston at Newb'g,	8 60	8 60	8 60	8 60	8 80	8 20
Lacka'na at Rond't,	8 30	8 30	8 30	8 50	8 90	8 00
Wilk'b're at Hob'kn,	8 50	8 35	8 35	8 35	8 35	8 00

For freights to different points, see "Freights."

Foreign and Provincial Freights.

August, 1869.

Foreign.

New-Castle and Ports on Tyne, ...	£15@£18 keel.
Liverpool, ...	15s. 17s. ton.

TO NEW-YORK.

Provincial.

Sydney, ...	$3 25
Lingan, ...	3 25
Cow Bay, ...	3 25
Port Caledonia, ...	3 25
Little Glace Bay, ...	3 25

TO BOSTON.

Sydney, ...	$2 75
Lingan, ...	2 75
Cow Bay, ...	2 75
Port Caledonia, ...	3 00
Little Glace Bay, ...	2 75

Prices at Baltimore, August, 1869.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load, ...		$7 25
Pittston and Plymouth, ...	$7 00	7 25
Shamokin R., or W. Ash., ...	7 25	7 50
Lykens Valley, R. A., ...	6 75	7 00
Trevorton, R. A., ...	6 50	6 75
By retail, per ton of 2240 lbs. delivered, ...	8 50	9 00
Georges Creek & Cumberland f. o. b. at Locust Point for shipping, ...		5 00
West Fairmount Gas, f. o. b., ...		6 50

Prices at Georgetown, D. C., & Alexandria, Va.

August, 1869.

George's Creek & Cumberland f. o. b. for shipping, ...	$4 75

Prices at Havre de Grace, Md.

August, 1869.

Wilkesb're & other White Ash for cargoes,		$7 25
Lykens Valley, ...		7 25
Shamokin R. or W. Ash, ...	7 00	7 50
Trevorton and Zerba Valley, ...	6 75	7 00

Prices for Coal at Mauch Chunk.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Lehigh, ...	$5 00	$5 00	$5 00	$5 00	$5 00	$4 50
Wilkesbarre, ...	5 00	5 00	5 00	5 00	5 00	4 50

Freight to Elizabethport, $3.17; to New-York, $2.35.

Prices of Foreign Coals.

August, 1869.

Duty, $1.25 per ton.

Corrected weekly by PARMELEE BROS., 32 Pine-street, New-York.

Liverpool Gas Caking, ...	$ 9 50	
" " Cannel, ...	14 00	
" House "	18 00	19 00
" " Orrel, ...	16 00	18 00
Per ton 2240 lbs., Ex. Ship.		
PRICES FROM YARD.		
Liverpool House Orrel, screened, ...	$16 00	$18 00
" " Cannel, "	18 00	20 00
Per ton 2000 lbs., delivered.		

Prices of Gas Coals.

August, 1869.

PROVINCIAL.

Duty, $1.25.

	Coarse. Gold.	Slack. Gold.
Block House, ...	$1 75 @$	75
Gowrie, ...	1 75	75
Lingan, ...	1 75	75
Sydney, ...	2 13½	71½
Pictou, ...	2 13½	1 18½
Little Glace Bay, ...	1 50	1 00
Caledonia, ...	1 50	75

AMERICAN.

	Coarse. Currency.	Slack. Currency.
Westmoreland Co., ...	—	—
Despard Coal Co., ...	$8 50	8 00
Penn.		
Newburg Orrel Gas, ...	—	—
West Fairmount Gas Coal, ...		8 00

AT PHILADELPHIA.

Powelton, ...	7 80

Freights.

August, 1869.

To Eastern Ports.	From Philadel'a.	From E. Port and Port Johnston.	From Newburg.	From Rondout.
Stamford, ...	$2 00	$1 00	$1 25	$1 25
Norwalk, ...	2 00	1 00	1 25	....
Bridgeport, ...	2 00	1 15	1 25	1 25
New-Haven, ...	2 00	1 00	1 25	1 25
Hartford, ...	2 75	1 10	....	1 65
New-London, ...	2 00	1 15	1 35	1 35
Norwich (and tow), ...	2 00	1 25	1 45	1 45
Mystic, ...	2 00	....	1 40	....
Stonington, ...	2 00	....	1 40	1 35
Sag Harbor, ...	2 00	....	1 40	....
Bristol, ...	2 00	....	1 55	1 60
Newport, ...	2 00	1 40	1 55	1 60
Fall River, ...	2 00	1 40	1 55	1 60
Providence, ...	2 00	1 40	1 60	1 60
Dighton, ...	....	....	1 60	....
Warren, ...	....	....	1 60	....
Pawtucket, ...	2 00	....	1 75	1 75
New-Bedford, ...	2 00	1 40	....	1 75
East Cambridge, ...	2 50	....	2 00	....
Salem, ...	2 50	1 75	1 85	1 75
Newburyport, ...	2 75	2 00	1 95	1 80
Portsmouth, ...	2 75	1 75	1 90	1 80
Rockport, ...	....	....	1 90	....
Saco, ...	2 75	1 75	1 90	1 75
Portland, ...	2 50	1 75	1 80	....
Bangor, ...	2 75	....	1 80	1 80
Bath, ...	2 50	....	2 00	....
Middletown, ...	....	....	....	....
Amesbury, ...	2 70	....	....	....
Boston, ...	2 50	....	....	....
Cambridgeport, ...	2 60	....	....	....
Taunton, ...	2 50	....	....	....
Derby, ...	2 00	1 25	....	....
New-York, ...	1 55	55	....	....
Hackensack, ...	1 75	..	....	....
Jersey City, ...	1 65	35	....	....
To River Ports.				
Troy, ...	1 75	95	60	65
Albany, ...	1 75	90	55	50
Coeyman's, ...	1 60	....	55	50
Stuyvesant, ...	1 50	....	50	45
Coxsackie, ...	1 60	....	45	45
Hudson, ...	....	1 00	40	50
Catskill, ...	....	....	40	35
Poughkeepsie, ...	1 60	75	30	25
Fishkill, ...	1 60	....	20	30
Cold Spring, ...	1 60	70	30	50
Haverstraw, ...	....	50	45	55
Nyack, ...	1 60	50	55	50
Sing Sing, ...	1 60	....	60	50
Yonkers, ...	....	40	60	55
New-York, ...	1 55	50	70	....
Saugerties, ...	1 55	....	35	30
Rhinebeck, ...	1 60	....	30	35
Rondout, ...	1 60	60	30	25
Tarrytown, ...	1 60	80	60	....
West Point, ...	1 60	75	30	50

Rates of Transportation to Tide Water.

[BY RAILROAD.]

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkil Haven, ...	$2 50

From Port Carbon, 8 cents per ton more.

TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton, ...	$1 15
C. R. R., N. J., Easton to Elizabethport, ...	1 81
	$2 96
Shipping Expenses at Elizabethport, ...	25
Total, ...	$3 21

, TO PORT JOHNSON.

L. V. R. R.	$1 15
C. R. R. of N. J.	1 80
Shipping Expenses, ...	25
Total, ...	$3 20

TO HOBOKEN.

L. V. R. R.	$1 15
Morris & Essex R. R., ...	1 65
Shipping Expenses, ...	25
Total, ...	$3 06

Metals.

IRON.—Duty: Bars, 1 to 1½ cents ₩ lb; Railroad, 70 cents ₩ 100 lbs.; Boiler and Plate, 1½ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1½ to 1¾ cents ₩ lb; Pig, $9 ₩ ton; Polished Sheet, 3 cents ₩ lb.

Pig, Scotch, No. 1, ₩ ton, ...	37 50@42 —
Pig, American, No. 1, ...	42 — — —
Pig, American, No. 2, ...	38 — 39 —
Pig, American, Forge, ...	36 — — —
Bar, Refined, English and American, ...	85 — 90 —
Bar, Swedes, assorted sizes (gold), ...	82 50 87 50
STORE PRICES.	
Bar, Swedes, ord'y sizes, ...	less 5 ₩ ct., — — 140 —
Bar, Refined, ...	less 5 ₩ ct., 90 — 92 50
Bar, Common, ...	less 5 ₩ ct., 85 — 87 50
Scroll, ...	less 5 ₩ ct., 120 — 150 —
Ovals and Half-round, ...	less 5 ₩ ct., 117 50 142 50
Band, ...	less 5 ₩ ct., 117 50 — —
Horse Shoe, ...	less 5 ₩ ct., 117 50 — —
Rods, ¼ to 3-16 inch, ...	less 5 ₩ ct., 97 50 155 —
Hoop, ...	less 5 ₩ ct., 125 — 180 —
Nail Rod, less 5 ₩ ct., ...	8¼ — 9¼
Sheet, Russia, as to Nos. (gold), ...	— 11 — 12¼
Sheet, Single, D. and T. Common, ...	— 5 — 7
Sheet, Galvanized, ...	List 20 @ 25 ₩ cent dis.
Rails, English (gold), ₩ ton, ...	— — 56 50
Rails, American, at Works in Pa., ...	74 00 76 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 2½ cents ₩ lb, and 10 ₩ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₩ lb,	— 18 @ — 22
English Spring (2d and 1st quality), ...	— 9 @ — 11½

English Blister (2d and 1st quality),	—	11¼@	— 19
English Machinery,	—	12¼@	— 15
English German (2d and 1st quality),	—	14 @	— 16
American Blister, "Black Diamond,"	—	10½@	— 16
American, Cast, Tool, "	—	19 @	— —
American, Spring, "	—	10 @	— 13
American Machinery, "	—	— @	— 13
American German, "	—	10 @	— 13

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper cents ₱ ℔; Manufactured, 45 per cent ad val.

	All Cash.		
Copper, New Sheathing, ₱ ℔,	—	@	— 32
Copper Bolts,	—	@	— 33
Copper Braziers, 16oz. and over,	33	@	— 35
Copper Nails,	38	@	— 40
Copper, Old Sheathing, etc., clean,	20	@	— 22
Copper, Chili Pig,	—	@	— —
Copper, American Ingot,	23	@	— 23½
Yellow Metal, New Sheathing,	—	@	— 27
Yellow Metal Bolts,	—	@	— 27
Yellow Metal Nails,	—	@	— 27

LEAD.—Duty: Pig, $2 ₱ 100 ℔s.; old Lead, 1½ cts. ₱ ℔; Pipe and Sheet, 2½ cents ₱ ℔.

Galena, ₱ 100 ℔s,	—	@	— —
Spanish (gold),	$6 30	@	$6 37½
German "	6 30	@	6 50
English "	6 30	@	6 87½
Bar, (net.)	9 00	@	— —
Pipe and Sheet, "	9 45	@	— —

TIN.—Duty: Pig, Bars, and Block, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold, ₱ ℔.		
Banca,	—	@	— 35
Straits,	31½	@	— 32
English,	31½	@	— —

Plates.	Gold.		Currency.
Fair to good brands,			
I. C. Charcoal, ₱ box,	$8 50	@ $8 62½	$11 75 @ $12 00
I. C. Coke,	7 00	@ 7 50	9 75 @ 10 75
Coke Terne,	—	@ 6 00	8 00 @ 8 50
Charcoal Terne,	8 00	@ 8 25	11 00 @ 11 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1.50 ₱ 100 ℔.

	Gold.		
Plates, Foreign, ₱ 100 ℔.	$6 37½	@	$6 50
Plates, Domestic, ₱ ℔.	11	@	12

REMARKS.

IRON.—There is a slight improvement in the demand for Scotch Pig. The stock, which has been steadily accumulating for some time past, is now of considerable magnitude, and holders have submitted to a slight concession in prices, which has induced a little more inquiry. The sales are 350 tons Glengarnock at $38.25 @ $38.50; 250 do. Eglinton, $38; 100 do. Gartsherrie, from yard, $41; 100 do. Monkland and 56 do. Clyde, on private terms. The demand for American is still light, but, with moderate offerings, prices are sustained; 100 tons No. 1 Thomas sold at $42. New Rails are in request at $56.50 gold for English, and $74 @ $76 currency at the works; 250 tons, 56-℔., Erie, sold at $56 gold. Fifty tons Cast Machinery sold at $40 currency. Bar continues nominal at previous quotations for lots from store. The action of the Iron manufacturers has not transpired.

COPPER has advanced to 23½c., the nominal quotation for both Lake and Baltimore. For September delivery 23½c. @ 23¾c. has been paid. The market, however, is quiet and dull. Sales for the week 700,000 ℔s. The Baltimore Copper Company has disposed, during the last month, of 800,000 ℔s Ingot in bond, for export. The manufacturers still keep out of the market.

The London market is very dull at £62 for Chili Bars, with a declining tendency.

TIN.—Since the large business done ten days or a fortnight ago, Straits has been quiet, with a jobbing business only, at 31½c. gold. In Boston 800 slabs were sold at 31½c. @ 31¾c. gold. Banca, without stocks, nominal price 35c. English 31½c. gold.

The London market is steady at £132 for Straits.

LEAD is in small stock. On the spot, to arrive, it is offered at $6.25 @ $6.30 gold for ordinary foreign. Sales 300 tons in lots at $6.20 @ $6.35.

SPELTER dull at $6.37½ gold, with sales of 75 tons in lots.

ZINC.—French Dry Zinc, 12½c. @ 13c.; American Dry Zinc, 8½c. @ 9c.; Metallic Zinc, 12½c.; Duty 2½c. per pound.

MANGANESE.—Pembroke Brand Black Oxide Manganese Powered, 5c.; Large, 4½c.

Mining Stocks.

NEW-YORK, August 19th, 1869.

BUSINESS continues light at the Board, with prices for some leading gold and silver stocks slightly advanced. Petroleums range lower. An exceptional case is Central, which sold yesterday at 66 cents.

Consolidated Gregory,	$2 00	2 05
Grass Valley,	35	45
Gunnell Gold,	—	50
Mariposa,	7½	8½
" pfd.	12	14
Montana Gold,	—	15
Quartz Hill,	1 20	1 25
Smith & Parmelee Gold,	2 75	2 90
Quicksilver,	15½	16
Davidson Copper,	—	30
Flint Steel River,	—	4 00
Wallkill Lead,	10	—
" " assented,	14	20
Tudor Lead,	4 15	—
Cumberland Coal,	35	35½
Lehigh and Susquehanna Coal,	75	—
Bennehoff Petroleum,	30	—
Brevoort,	1 90	2 30
Buchanan Farm,	53	—
Central,	64	68
Home Petroleum,	5 50	—
N. Y. & Alleghany,	70	78
Northern Light,	45	—
Rynd Farm,	20	—
United Petroleum Farms,	16	—
Union,	15 00	16 00

San Francisco Stock Market.

SAN FRANCISCO, CAL., August 19, 1869.

Stocks.	*Bid per ft.*	*Share*
Gould & Curry,	86	
Savage,	55	
Chollar Potosi,	19½	19
Ophir,	16	
Hale & Norcross,	108	107
Crown Point,	28	
Yellow Jacket,	35	34½
Belcher,	20	
Imperial,	50	
Alpha,	18	
Kentuck,	170	
Amador,		

ASSESSMENT.

Kentuck Mining Company, $10, coin, per share. Delinquent, September 6th. Sale, September 25th.

COAL SHIPPERS.

E. B. ELY & CO.,
SHIPPERS OF
COAL,
33 Trinity Building, 111 Broadway,
NEW-YORK.
"Old Company's" Lehigh, J. H. Swoyer's Enterprise, Wyoming, Wilkesbarre, and Locust Mountain Bituminous Coal.
E. B. ELY. S. W. ELY.
Apr. 24-1y-q

POWELTON COAL AND IRON CO.,
SOLE MINERS AND SHIPPERS
Of the celebrated
POWELTON
Semi-Bituminous Gas and Anthracite Coals,
104 WALNUT STREET, PHILADELPHIA.
BRANCH OFFICES:
New-York, Trinity Building; 17 Doane-street, Boston; Cleveland, O; Pittsburgh, Pa. Jan. 30-6m-is.

SAMUEL BONNELL, JR.,
Offers for Sale his
SUGAR CREEK
AND
HONEY BROOK
LEHIGH COALS,
OFFICE—43 AND 45 "TRINITY BUILDING," 111 BROADWAY, N. Y.

HONEY BROOK COAL COMPANY,
Exclusive Miners and Shippers of the Celebrated
HONEY BROOK LEHIGH COAL,
No. 111 BROADWAY, NEW-YORK.
JAS. H. LYLES, Agent.
Wharves, Port Johnson, N. J. Philadelphia Office, 209 Walnut-street.
Apr. 20 1y J. B. McCREARY, President.

WILKESBARRE COAL,
Delivered Direct from the Mines of
The Wilkesbarre Coal and Iron Co.,
OR FOR RESHIPMENT AT
HOBOKEN AND JERSEY CITY.
Office, No. 80 Broadway,
April 1-1y NEW-YORK.

WHITE, FOWLER & SNOW,
Successors to JOHN WHITE & CO.,
Wilkesbarre and Lehigh Coal,
FOR STEAM AND FAMILY USE.
OFFICE,
ROOM NO. 75, 111 BROADWAY (Trinity Building).
JNO. WHITE. LINDLEY H. FOWLER. LOUIS T. SNOW.
Jan. 1-1y

DAY, HUDDELL & CO.,
MINERS AND SHIPPERS OF
HARLEIGH LEHIGH COAL,
And the Celebrated
HICKORY, BROAD MOUNTAIN, EXCELSIOR, SHAMOKIN AND NEW-ENGLAND RED ASH.
OFFICES,
ROOM 51, TRINITY BUILDING, 111 Broadway.
Philadelphia, 109 WALNUT STREET. Boston, 7 DOANE STREET.
ap. 20-1y

COXE BRO.'S & CO.,
Cross Creek Colliery,
Miners and Shippers of the Celebrated
Cross Creek Free Burning Lehigh Red Ash Coal,
FROM THE BUCK MOUNTAIN VEIN.
OFFICES:
Philadelphia, No. 341 Walnut Street. | Drifton, Jeddo P. O., Luzerne Co., Pa.
Agent in New-York, SAMUEL BONNELL, JR., Room 43, Trinity Building,
Feb.-1y 111 Broadway.

H. N. BURROUGHS, Pres't. H. T. SHILLINGFORD, Sec'y.
H. H. SHILLINGFORD, Treas.
KITTANING COAL COMPANY,
SOLE MINERS AND SHIPPERS OF
BITUMINOUS COAL,
FROM THE COLLIERIES:
Tunnel Hill (LEMON VEIN), Gallitzin Cambria Co.
Beaverton (PHŒNIX VEIN), Osceola Mills, Clearfield Co.
Unequalled for Steam, Rolling Mills, Forges, Glass Works, Brick Kilns, Lime Kilns, and Coke, for the Manufacture of Steel, etc.
OFFICE:
125 South Fourth Street (Forrest Place).
July 6-6mo

PICTOU COAL!
The undersigned are prepared to contract for the delivery of *this well-known* COAL, either on board vessel at Pictou, or at any port in the United States.
Sample parcels sent as required.
BIRD, PERKINS & JOB,
39 INDIA WHARF, 86 SOUTH ST.,
Aug. 10-3m Boston. New-York.

A MAN of middle age and experience, capable of managing a mechanical business or manufactory, desires to negotiate for a permanent situation. West preferred. The objects of his present engagement being nearly accomplished, he refers to his present employers and others. Address Engineer, care W. E. CHURCH, 14 Wall Street, or this office. July 20-tf

COAL SHIPPERS.

Pier No. 14 North Pt. Richmond.
C. J. & J. H. EASTWICK & CO.,
SHIPPERS OF
WHITE AND RED ASH COAL.
No. 228 DOCK STREET, PHILADELPHIA, and No. 19 DOANE STREET, BOSTON.
BURNSIDE RED ASH, SHAMOKIN WHITE ASH, LOCUST MOUNTAIN WHITE ASH COAL.
Jan.1y-is s.a.

THE DESPARD COAL COMPANY
OFFER THEIR SUPERIOR
DESPARD COAL
To Gas Light Companies throughout the country.
MINES IN HARRISON COUNTY, West Virginia.
WHARVES, LOCUST POINT, COMPANY'S OFFICE, No. 29 South St., } Baltimore.
AGENTS:
PARMELE BROTHERS, No. 32 Pine St., New-York.
BANGS & HORTON, No. 31 Doane Street, Boston.
Among the consumers of Despard Coal we name: Manhattan Gas Light Co., New-York; Metropolitan Gas Light Co., New-York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C.; Portland Gas Light Co., Portland, Me.
☞ Reference to them is requested. May 30-1y

LEWIS AUDENRIED & CO.,
Miners and Shippers of the following celebrated
ANTHRACITE COALS.
From Philadelphia and the Mines.
DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash OLD COMPANY'S LEHIGH; WILKESBARRE.
From Port Johnston and Jersey City,
OLD CO.'S LEHIGH, HAZLETON, WILKESBARRE, AND SHENANDOAH COALS.
Also the superior CUMBERLAND COALS,
BROAD TOP, SEMI-BITUMINOUS, at Philadelphia. BARTON, GEORGES CREEK, at Baltimore. BARTON, GEORGES CREEK, at Alexandria.
205 Walnut Street, PHILADELPHIA; 14 Kilby Street, BOSTON; 34 Westminster Street, PROVIDENCE; 24 Second Street, BALTIMORE.
110 BROADWAY, NEW-YORK.
July 13-1y

English Coal and Cannel.
DESPARD COAL, from Baltimore,
PROVINCIAL COAL,
ANTHRACITE COAL.
For sale in lots to suit.
PARMELE BROS.,
Agency of OSCAR I. VAN WART, Liverpool.
OFFICE, No. 32 PINE STREET, NEW-YORK.
Yard, West 22d Street, near 10th Avenue.
Feb.27-1y

W. D. CRANE & CO.,
SHIPPERS OF
Anthracite and Bituminous
COAL,
For Iron and Steam Purposes.
NEW-YORK: 115 Broadway. | BOSTON: 26 Kilby Street.
Apr.10-tf

VAN WICKLE & STOUT,
Miners and Shippers of
FULTON & STOUT
LEHIGH COALS.
Office, 119 Broadway, Room 18, New-York.
Our Fulton Lump is a Superior Article for FOUNDRY USE. Feb.20-1y

MORRIS & BRAMAN,
SHIPPERS OF
Lehigh, Wilkesbarre, Hazleton, Chauncey, Red Ash, and Bituminous
COAL.
Office, 47 Trinity Building, 111 Broadway, New-York.
E. L. MORRIS. J. A. BRAMAN.
Apr.24-tf-q

G. B. LINDERMAN & CO.,
MINERS,
Sugar Loaf, Lehigh Coal.
OFFICE:
50 TRINITY BUILDING,
May 23-1y 111 BROADWAY, N. Y.

TYLER & CO.,
SOLE AGENTS FOR THE SALE OF
J. J. Conner's "Girardville" and "McMichael" Locust Mountain and "Duncan" Red Ash Coals.
Also, dealers in the best varieties of Lehigh, Shamokin and Wilkesbarre
COALS.
16 TRINITY BUILDING, New-York.
19 DOANE STREET, Boston.
328 WALNUT STREET, Philadelphia.
HATCH & TYLER, Hartford, Conn.
May 1-1y Box 1371, P. O., N. Y.

RANDOLPH BROTHERS,
SOLE AGENTS OF THE ORIGINAL
SPRING MOUNTAIN LEHIGH COAL,
Extensively Used for Smelting Iron.
ROOMS, 28 AND 30, TRINITY BUILDING,
NEW-YORK.
Apl. 6-tf

ENGINEERS.

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Analytical and Consulting Chemist.
LABORATORY, 327 WALNUT ST., PHILADELPHIA.
Analyses and Assays of Natural and Artificial Substances. Researches and Consultations on Chemico-technical Questions. Instruction in Analytical Chemistry and Metallurgy. Aug. 17-1y

P. H. VAN DER WEYDE, M.D.,
Professor of Chemistry and Metallurgy,
N. Y. DENTAL COLLEGE,
(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)
Analytical and Consulting Chemist and Engineer.
RESIDENCE—73 Seventh Street.
LABORATORY—Twenty-third Street, cor. of Sixth Avenue.
Office ENGINEERING AND MINING JOURNAL, 37 Park Row, New-York City.
Jan. 30-tf

LABORATORY
OF THE
ATLANTIC QUARTZ CO.,
3045 and 3047 Chestnut St., Philadelphia,
Under the Direction of
CHARLES P. WILLIAMS,
Late Professor of Analytical and Applied Chemistry, Polytechnic College of the State of Pennsylvania, for the Analysis, Assay and Valuation of Ores, Minerals, Fertilizers and Commercial Products, and for instruction in Analytical, Experimental and Technical Chemistry.
☞ Special attention given to Fertilizers.
Feb. 20-1y-is

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Mining and Civil Engineer and
METALLURGIST,
From the Imperial School of Mines, Paris, Member o the Geological Society of France, etc.
OFFICE, WILKESBARRE, PA.
Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of Mineral property, superintend Mines and Metallurgical Works, Assay Ores, etc. 18-2-qp

BENJAMIN SMITH LYMAN,
Mining Engineer, Geologist and Topographer,
No. 135 South Fifth Street, Philadelphia.

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CIVIL AND MECHANICAL ENGINEERS,
BUILDERS OF
Herthel's Patent Truss, and other Iron Bridges, Roofs, and Turn-Tables. Also Howe's Patent Truss, and other Timber Bridges, Roofs, and Turn-Tables.
Corrugated Iron Doors, Shutters, and Iron Building Material generally. Contractors for Piling, Docking, and General Railroad Work.
July 20-1y SPRINGFIELD, MASS.

A. D. BRIGGS & CO.,
CIVIL AND MECHANICAL ENGINEERS,
BUILDERS OF
Truesdell's Patent Truss Bridge, and other Iron Bridges, Roofs, and Turn-Tables. Also Howe's Patent Truss Bridge and Roof, and other Timber Bridges and Turn-Tables. Particular attention given to repairing all kinds of Bridges. All work warranted to give satisfaction. Plans, Estimates, and Specifications, upon application.
July 20-1y SPRINGFIELD, MASS.

Adolph Ott, Chemical Engineer,
May be employed professionally as an expert on practical subjects, involving both Chemical and Mechanical knowledge. A specialist in various branches of Technology. Assays and Analyses of all kinds. Address, Editorial Rooms of the "Engineering and Mining Journal," 37 Park Row, New-York City.
☞ Written communications preferred. Nov. 28-tf.

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Wood-Engraving Establishment.
Engraving, Designing, and Photographing on Wood, in all its branches, viz: Portraits, Fine Book Work, Machinery, Maps, Buildings, Illustrated Catalogues, Views, etc. N.B. Special attention given to Color Work of all descriptions. 48 BEEKMAN STREET, New-York.

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Counsellor at Law and Solicitor of Patents.
37 Park Row, New-York.
PATENTS PROCURED
on all improvements in Machinery, Chemical Processes, Compositions, etc. Mining inventions will receive very careful attention. Advice as to the manner of proceeding given free by writing for it. Assignments, Licenses, and Agreements relating to Patents drawn with care. An experience of five years has enabled me to become very familiar with all the requirements of the Patent law, and the working of the Patent Office.
Refer to MESSRS. WESTERN & CO.
March 27-tf.

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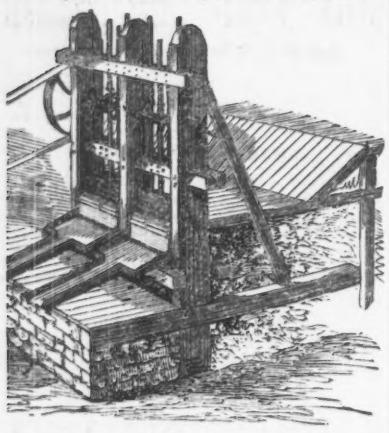
Mining Machinery and Supplies.



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With Self-Discharging Quicksilver Apparatus.

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Rock Breakers, Retorts, Engines, Boilers, and Shafting, Shoes and Dies of the best White Iron and Steel.

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Concentration by means of Air

has long been attempted, but hitherto without satisfactory results. **S. R. KROM** has invented and patented machines which concentrate the various ores more perfectly than can be done by any other means.

The **Mechanical Combinations** are extremely simple, the machines therefore correspondingly durable. A continuous self-delivery of ore on one side and tailings on the other is effected, hence very little attention is required except keeping the hopper supplied with ore. The power of one man is sufficient to operate a machine that will concentrate one ton per hour.

Parties Interested in Mining are invited to call at No. 210 Eldridge Street, New-York, where they may see a machine in operation, and have samples of their own ores crushed and concentrated.

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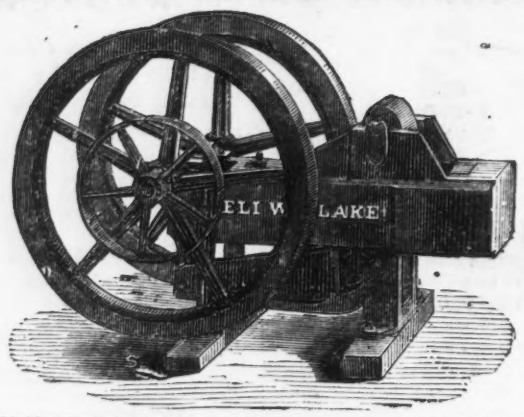

The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

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☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well-contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly wheel, are made and used in violation of our patent.

March 14-1y 351 **BLAKE BROTHERS, New-Haven, Conn.**

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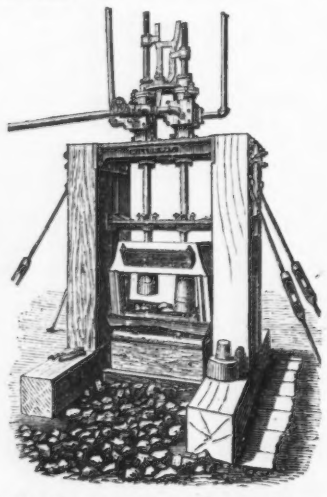
OF PHILADELPHIA, PA.

Are now prepared to supply Miners and other parties with their



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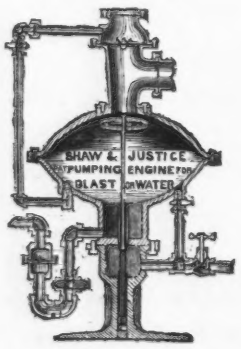

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ONE HALF OF THE POWER AND PRICE SAVED, AND EFFICIENCY GUARANTEED. Aug. 3

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CHAS. HENDRIE, President.

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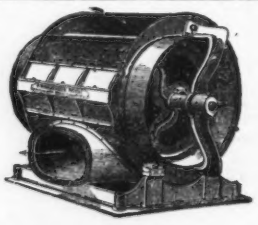

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Manufacturers of the

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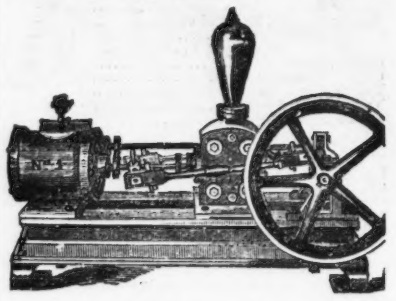

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Mar.14-1y GEORGE M. WOODWARD, President.

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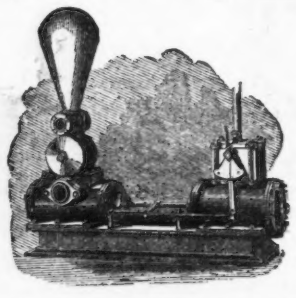

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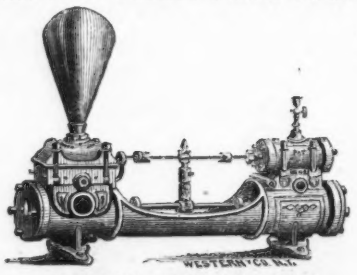

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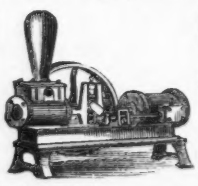

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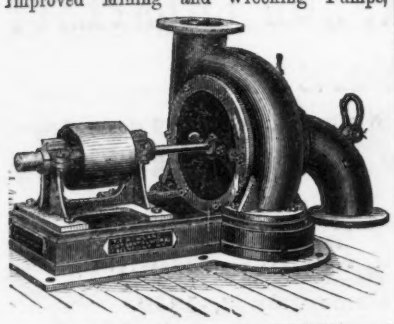

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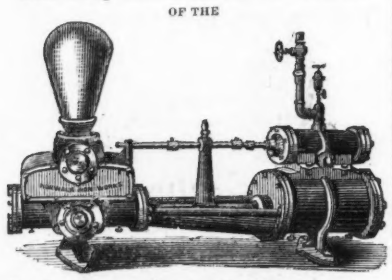

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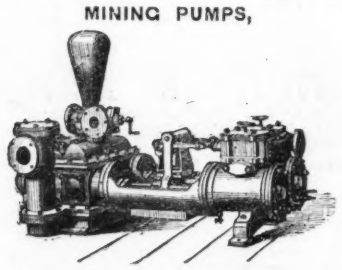

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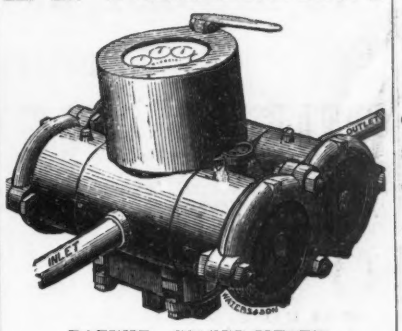

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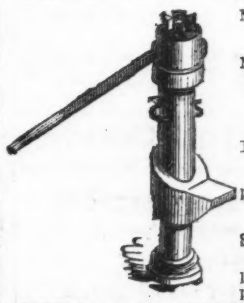

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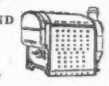

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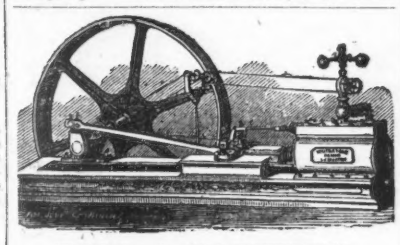

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Their cost is less than that of any other fire iron door or shutter.

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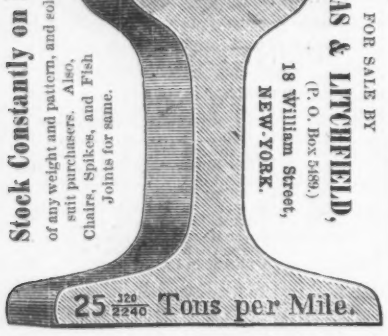

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